SHARP Service Manual

APSS
Auto Program Search System

DOLBY SYSTEM ®

* 'Dolby' and the 'Double-D' symbols are trade mark of Dolby Laboratories.
* Manufactured under licence from Dolby Laboratories.

PHOTO SG-500H

MODEL
SG-500H
SG-500E

In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

INDEX TO CONTENT

SPECIFICATION 2
DISASSEMBLY 3, 4
VOLTAGE SELECTION 4
LOCATION OF CONTROLS 5, 6
DIAL CORD STRINGING 6
CIRCUIT DESCRIPTION 7–52
ALIGNMENT OF THE PLAYER SECTION 53, 54
ALIGNMENT OF THE TAPE DECK SECTION . . . 55–60
ALIGNMENT POINTS (TAPE DECK SECTION) . . 61, 62
ALIGNMENT POINTS (TUNER SECTION) 63, 64
ALIGNMENT OF THE TUNER SECTION 65–68

SCHEMATIC DIAGRAM

*Audio Section 69, 70
*Tuner Section 71, 72
*Touch Control Section (1) 73, 74
*Touch Control Section (2) 75, 76
*Tape Deck Section 77, 78
*Tape Deck Logic Section 79, 80
*Tape Deck Mechanism/Muting Control Section . . . 81, 82
*Player Control Section 83, 84
*Player Motor Control/Arm Return Sensor/-
Player Mechanism Section 85, 86

WIRING SIDE OF P.W. BOARD

*Power/Sub-Power 87, 88
*Pre-Amp./MIC/FM Pre-set/Headphone/Speakers
Selector/Volume Control/Tone 89, 90
*Tuner/Lamp 91, 92
*Touch Control (1) 93, 94
*Touch Control (2)/Muting Control 95, 96
*Tape Deck/Tape Deck Logic 97, 98
*Tape Deck Mechanism/Player Motor Conrol . . . 99, 100
*Player Control/Arm Return Sensor 101, 102

VOLTAGE GUIDE OF P.W. BOARD

*Power/Sub-Power/Volume Control/Tone/-
Tape Deck Logic 103, 104
*Tape Deck/Tuner/Pre-Amp. 105, 106

TROUBLE SHOOTING 107–134

EXPLODED VIEW

*Tape Deck Mechanism (Top) 135, 136
*Tape Deck Mechanism (Bottom) 137, 138
*Player 139, 140

MISCELLANEOUS PARTS GUIDE 141–146
PARTS LIST 147–160

SHARP CORPORATION OSAKA, JAPAN

SPECIFICATIONS

TUNER-AMPLIFIER

General Description

Power source: a.c. 110/220/240V, 50/60Hz
Power consumption: 500W
Semiconductor: 31-IC (Integrated Circuit)
1-FET
65-Transistor
128-Diode
36-LED
Dimensions: 770mm (Width)
183mm (Height)
456mm (Depth)
Weight: 25 kg

Audio Section

Music power output: 2 x 80W/4 ohm both channels drive (at 0.5% distortion)
Continuous power output (at 1kHz):
2 x 45W/4 ohms, both channels driven, 0.5% distortion
Intermodulation distortion:
0.5% at 40W
Power bandwidth: 35Hz ~ 15kHz at 0.5% distortion
Frequency response: 20Hz ~ 20,000Hz
Channel separation: 48dB (1kHz)
Tone control: Bass ±10dB (at 100Hz)
Treble ±10dB (at 10kHz)
Input sensitivity and input impedance:
MIC; 1mV 10K ohms
REC/PB; 150mV/47K ohms
Output level and output impedance:
Speaker; 4 ohms
Headphones; 8 ohms
REC/PB; 30mV/100K ohms

FM Section

Frequency coverage: 87.6 ~ 108MHz
Usable sensitivity: 1.88µV (40kHz deviation, S/N=26dB)
Harmonic distortion: 0.5%
S/N ratio: 60dB
Stereo separation: 38dB (at 1kHz)

AM Section

Frequency coverage: LW; 150 ~ 370kHz
MW; 520 ~ 1620kHz
SW; 5.95 ~ 18MHz
Sensitivity: LW; 280µV/m
MW; 280µV/m
SW; 63µV
IF rejection (MW): 50dB
Image rejection (MW): 46dB

SG-500E

Power source: a.c. 240V, 50Hz

TAPE-DECK

Type: 4-track 2-channel stereo cassette tape deck with APSS and Dolby N.R. system
Tape: Philips standard compact cassette tape
Semiconductors: 1-LSI
19-IC
54-Transistor
53-Diode
Wow and flutter: 0.15% (DIN 45 507)
Frequency response: Normal tape: 20 ~ 14,000Hz (DIN 45 511)
CrO₂ tape or Fe-Cr tape; 20 ~ 15,000 Hz (DIN 45 511)
Signal to Noise ratio: 54dB
Channel Separation: 28dB (1kHz)

RECORD PLAYER

Semiconductors: 15-IC
43-Transistor
14-Diode

TURNTABLE

Motor: DC servo motor with 72 pole frequency generator
Drive system: Direct-drive system
Speed: 33-1/3 and 45 rpm
Speed control range: Within ±4% (Individual control for 33-1/3 and 45 rpm)
Wow and flutter: Less than 0.045% (WRMS)
Rumble: Better than 65dB (DIN-B)
Turntable platter: 31cm (12in) aluminum diecast with stroboscope marks

TONEARM

Type: Static-balance S-shaped pipe arm
Effective length: 210mm
Overhang: 14mm
Off-set angle: 19°
Cartridge weight range: 4 ~ 11 grams
Stylus pressure: 2 grams

Specifications are subject to change without prior notice.

DISASSEMBLY

* Disconnect all leads connected to the back of the unit.

A DUST COVER REMOVAL (Refer to Figure 3-1)

1. Fully open the dust cover.
2. Remove two hinges by moving the dust cover to the direction of arrow mark.

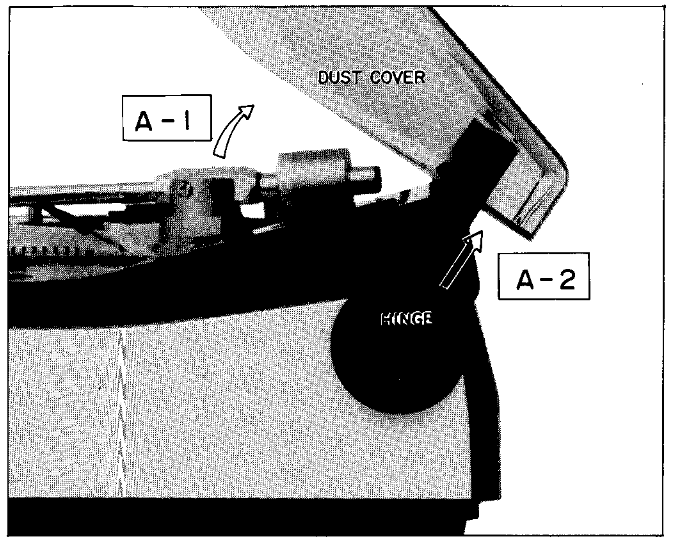

A-1
DUST COVER
A-2
HINGE

Figure 3—1

B PLAYER BOARD REMOVAL (Refer to Figure 3-2)

1. Remove the turntable sheet and the turntable.
2. Remove two screws retaining the player board.
3. Loosen the screw retaining the player board and move the screw in the arrowed direction.
4. Lift up the player board, and disconnect four sockets (CNS904–6 Pin, CNS905–7 Pin, CNS201–3 Pin, CNS-302-2 Pin).

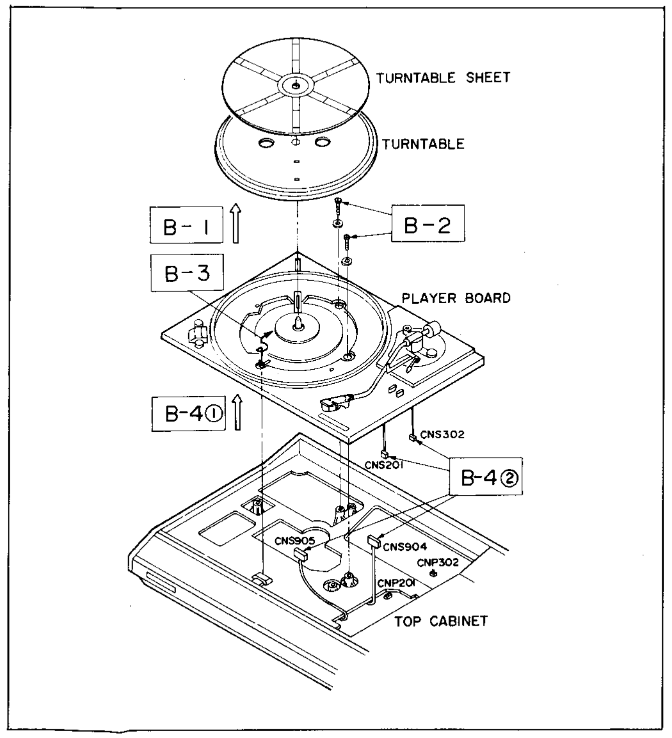

TURNTABLE SHEET
TURNTABLE
B-1
B-2
B-3
PLAYER BOARD
B-4①
CNS302
CNS201
B-4②
CNS905
CNS904
CNP302
CNP201
TOP CABINET

Figure 3—2

C TOP CABINET REMOVAL (Refer to Figures 3-3 and 3-4)

1. Remove the player board as discribed in player board removal.
2. Remove three knobs (REC LEVEL/TUNING) and the rubber cap. (Fig. 3-3)
3. Push the EJECT button and remove nine screws retaining the top cabinet. (Fig. 3-4)
4. Gently lift up the top cabinet.

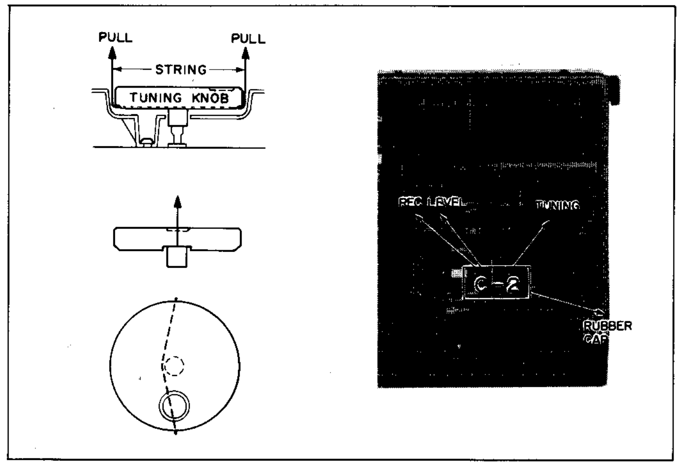

PULL
PULL
STRING
TUNING KNOB
REC LEVEL
TUNING
C-2
RUBBER CAP

Figure 3—3

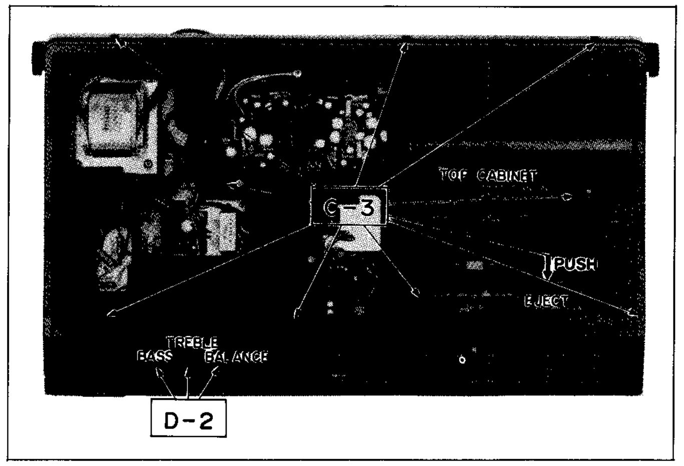

TOP CABINET
C-3
PUSH
EJECT
TREBLE
BASS
BALANCE
D-2

Figure 3—4

D FRONT PANEL REMOVAL

(Refer to Figures 3-4, 4-1, 4-2 and 4-3)

1. Remove the top cabinet as described in top cabinet removal.
2. Remove three knobs (BASS/TREBLE/BALANCE). (Fig. 3-4)
3. Remove six screws retaining the front cabinet. (Fig. 4-1 and 4-3)
4. Gently pull out the front panel while holding both sides.
5. Remove the screw retaining the power source indicator P.W. Board and disconnect six sockets (CNS701–7 Pin, CNS702–9 Pin, CNS801–12 Pin, CNS802–10 Pin, CNS803–18 Pin, CNS804–12 Pin). (Fig. 4-2)

E TAPE DECK REMOVAL (Refer to Figure 4-1)

1. Remove the top cabinet as described in top cabinet removal.
2. Disconnect the socket (CNS501–12 Pin) connected to the connecting P.W. Board.
3. Remove four screws retaining the tape deck.
4. Lift up the tape deck, and disconnect the socket (CNS503–8 Pin) connected to the tape deck P.W. Board.

F BOTTOM COVER REMOVAL (Refer to Figure 4-3)

1. Remove two screws retaining the bottom cover.

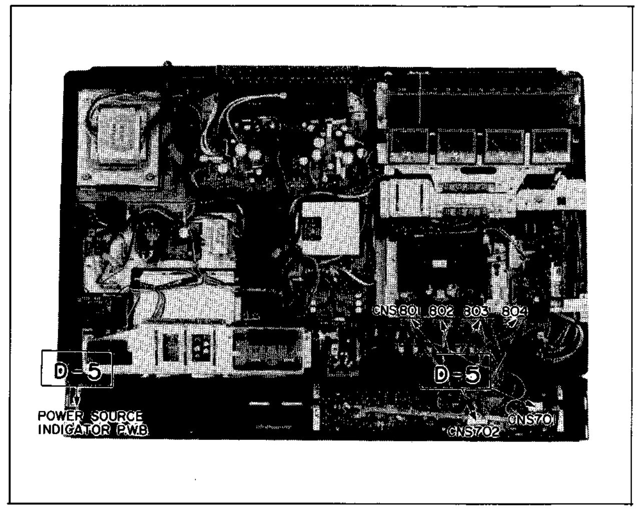

CNS801
802
803
804
D-5
D-5
POWER SOURCE INDICATOR P.W.B
CNS702
CNS701

Figure 4—2

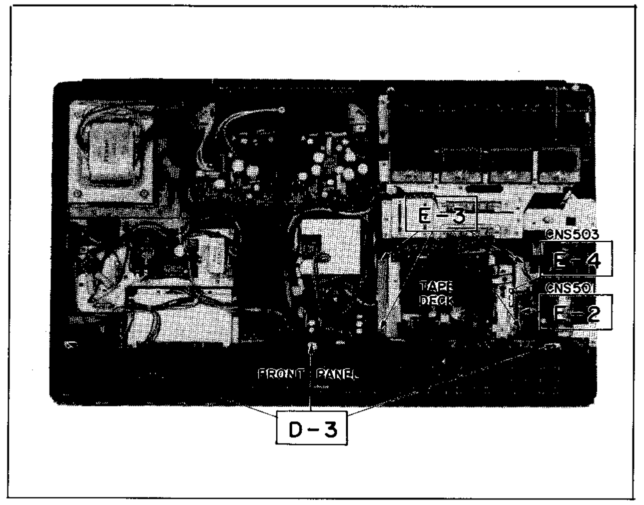

E-3
CNS503
E-4
CNS501
E-2
TAPE DECK
FRONT PANEL
D-3

Figure 4—1

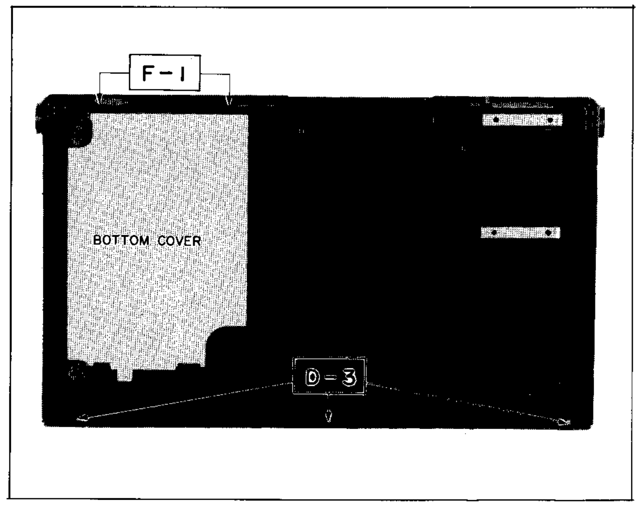

F-1
BOTTOM COVER
D-3

Figure 4—3

VOLTAGE SELECTION

SG-500H ONLY

Check the preset voltage selector before connecting the mains plug to a outlet. If the setting is different from that of your local mains supply voltage, the selector must be re-set as follows.

Rotate the voltage selector by using a screwdriver so that your local voltage number can be seen.

Note:

Since this set uses DC motors, the operation is regardless of whether a household power supply is of 50Hz or 60Hz.

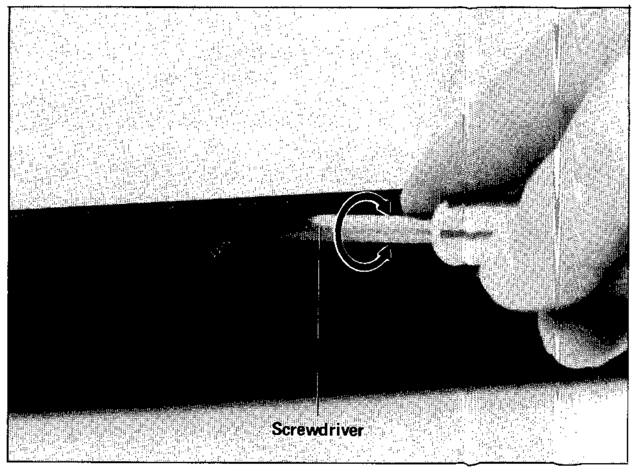
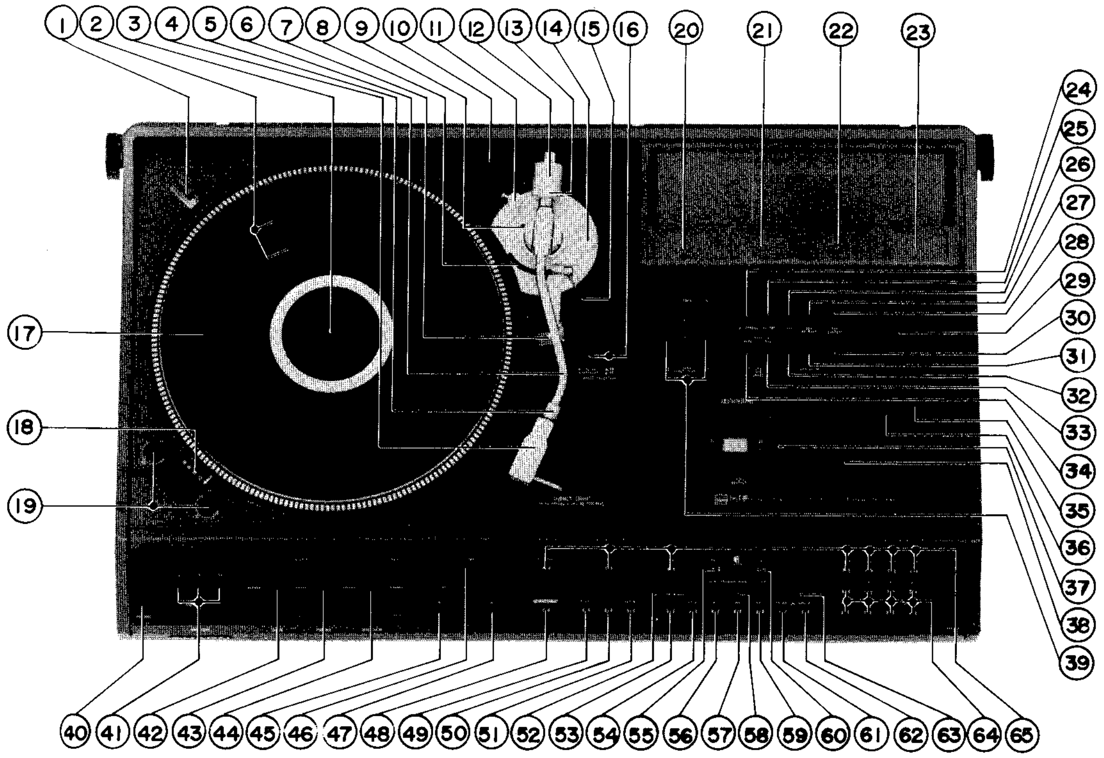

Screwdriver

Figure 4—4

LOCATION OF CONTROLS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62
63
64
65

Figure 5–1

1. Record-size detection light
2. Rcord-size detector part
3. Center spindle
4. Head-shell
5. Clamp collar
6. Tonearm
7. Tonearm rest
8. Tonearm lifter
9. Adjusting screw for automatic lead-in
10. Adaptor for 17cm (7") EP-record
11. Lateral balance control weight
12. Counter weight
13. Scale ring
14. Anti-skating control
15. Cueing control lever
16. Manual speed selector
17. Turntable-platter
18. Stroboscope lamp
19. Fine adjustment knobs for turntable speed
20. Record and playback level meter (Left channel)
21. Record and playback level meter (Right channel)
22. FM pre-set meter
23. Signal strength meter
24. Loudness switch
25. Stereo-mono selector
26. AFC switch
27. FM muting switch
28. FM stereo indicator
29. Manual tuning control
30. Dolby indicator
31. Dolby switch
32. ALC switch
33. Equalization selector switch
34. Bias selector switch
35. Tape counter reset button
36. Digital tape counter
37. Cassette chamber
38. Cassette eject button
39. Record level controls
40. Power source indicator
41. Speakers selector buttons
42. Bass control
43. Treble control
44. Balance control
45. Volume decrease button
46. Volume indicator
47. Volume increase button
48. Stand-by button
49. Play switch for turntable
50. Cut-out button for turntable
51. Repeat play button for turntable
52. Reverse indicator
53. Record button
54. Stop button
55. Reverse APSS button
56. Playback button
57. Rewind button
58. APSS indicator
59. Fast forward button
60. Forward APSS button
61. Pause button
62. Space setter button
63. Forward indicator
64. FM pre-set tuning buttons
65. Function selector buttons
66. Mains voltage selector
67. Mains power switch
68. Headphones jack
69. FM pre-set tuning controls
70. Microphone jacks
71. Beat canceller switch
72. FM aerial socket (300 ohms)
73. LW/MW/SW aerial socket
74. Record/Playback socket
75. Speaker terminals-A
76. Speaker terminals-B
77. U.K. standard FM co-axial aerial socket (75ohms), provided only for model SG-500E)

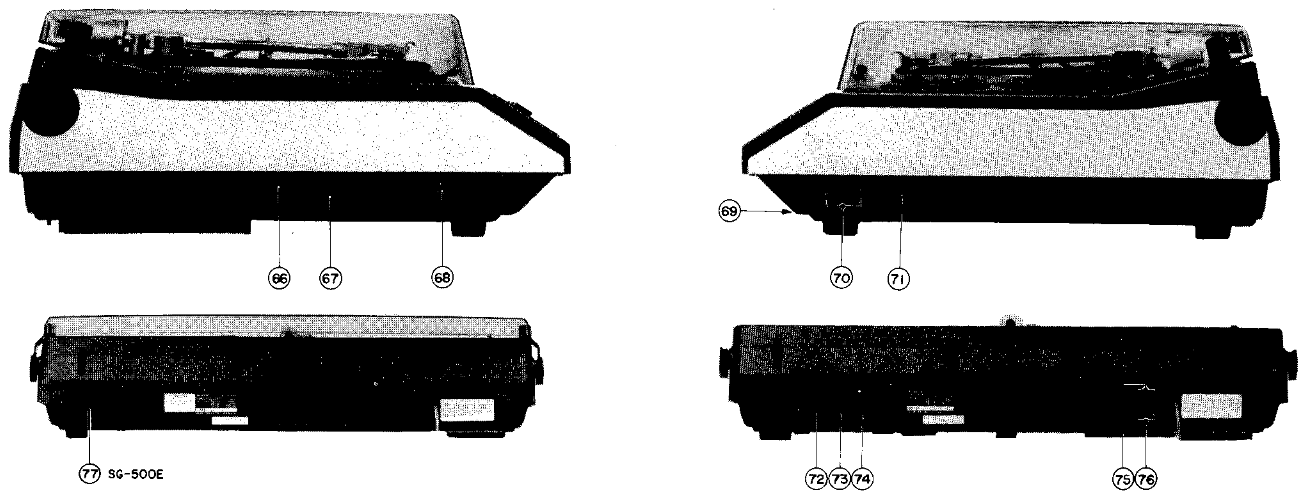
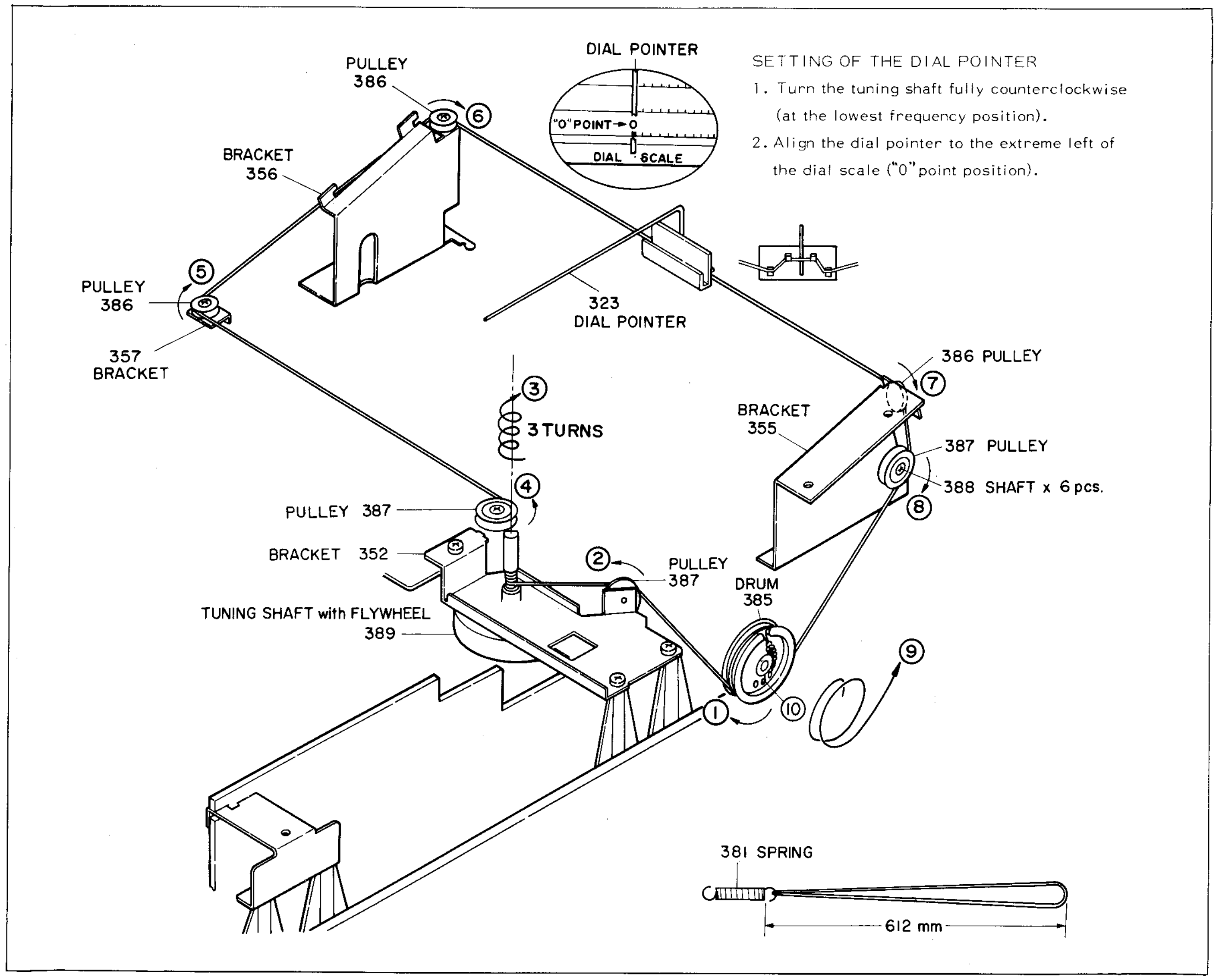

66
67
68
69
70
71
77 SG-500E
72
73
74
75
76

Figure 6–1

DIAL CORD STRINGING


PULLEY 386
DIAL POINTER
"O" POINT
DIAL SCALE
BRACKET 356
PULLEY 386
357 BRACKET
323 DIAL POINTER
386 PULLEY
3 TURNS
BRACKET 355
387 PULLEY
388 SHAFT x 6 pcs.
PULLEY 387
BRACKET 352
PULLEY 387
DRUM 385
TUNING SHAFT with FLYWHEEL 389
381 SPRING
612 mm
1
2
3
4
5
6
7
8
9
10

SETTING OF THE DIAL POINTER

1. Turn the tuning shaft fully counterclockwise (at the lowest frequency position).
2. Align the dial pointer to the extreme left of the dial scale ("0"point position).

Figure 6–2

CIRCUIT DESCRIPTION

SG-500H BLOCK DIAGRAM

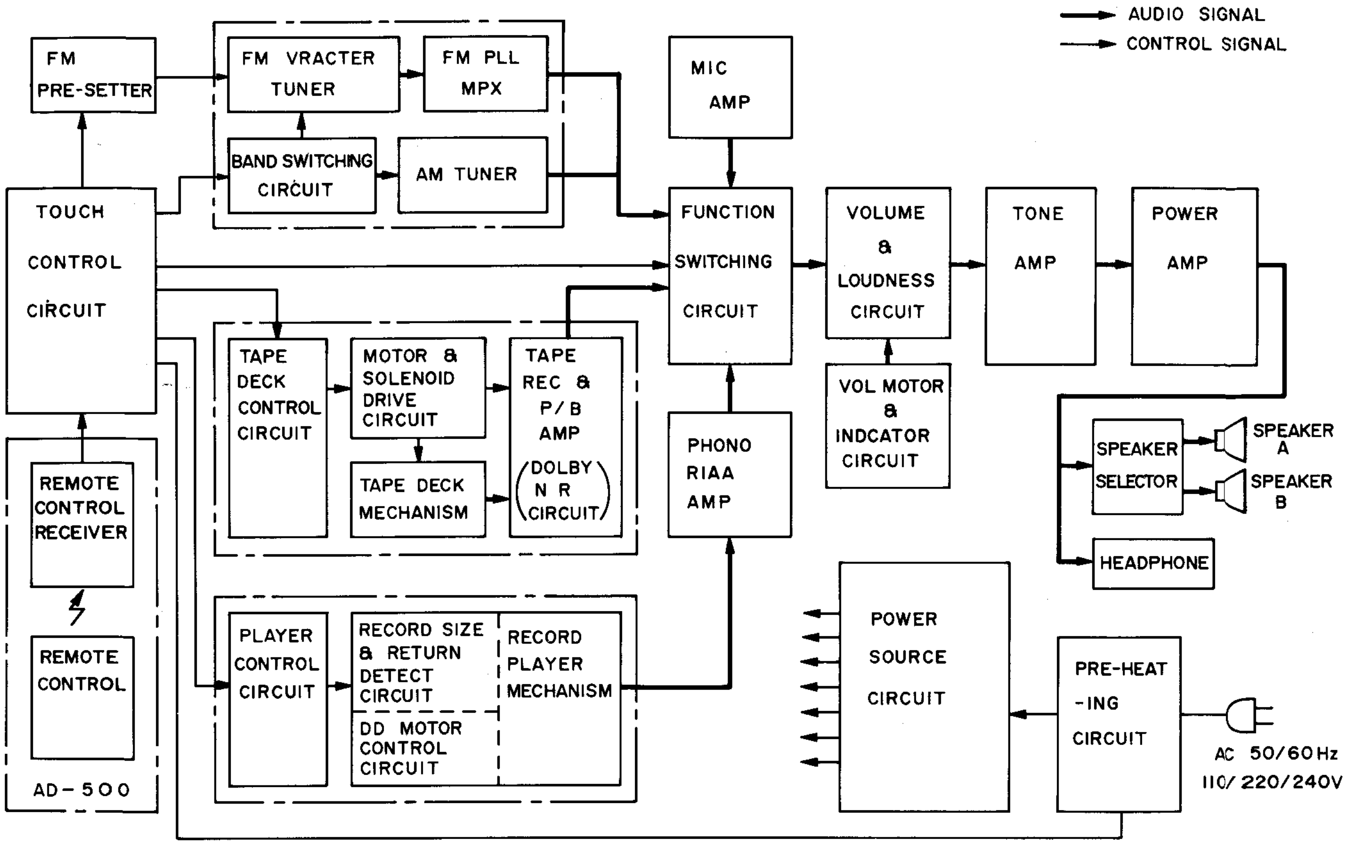

AUDIO SIGNAL
CONTROL SIGNAL
FM PRE-SETTER
FM VRACTER TUNER
FM PLL MPX
BAND SWITCHING CIRCUIT
AM TUNER
MIC AMP
TOUCH CONTROL CIRCUIT
FUNCTION SWITCHING CIRCUIT
VOLUME & LOUDNESS CIRCUIT
TONE AMP
POWER AMP
TAPE DECK CONTROL CIRCUIT
MOTOR & SOLENOID DRIVE CIRCUIT
TAPE REC & P/B AMP
DOLBY N R CIRCUIT
TAPE DECK MECHANISM
VOL MOTOR & INDCATOR CIRCUIT
PHONO RIAA AMP
SPEAKER SELECTOR
SPEAKER A
SPEAKER B
HEADPHONE
REMOTE CONTROL RECEIVER
REMOTE CONTROL
AD-500
PLAYER CONTROL CIRCUIT
RECORD SIZE & RETURN DETECT CIRCUIT
DD MOTOR CONTROL CIRCUIT
RECORD PLAYER MECHANISM
POWER SOURCE CIRCUIT
PRE-HEAT -ING CIRCUIT
AC 50/60Hz
110/220/240V

Figure 7—1

INDEX TO CONTENT

1. PRE AMP/POWER AMP/POWER SUPPLY 8
  1. 1 SYNOPSIS 8
  1. 2 CIRCUIT COMPOSITION 9
  1. 3 CIRCUIT EXPLANATION 12
2. TUNER CIRCUIT 16
  2. 1 AM SECTION 16
  2. 2 FM SECTION 18
3. TAPE DECK LOGIC CONTROL CIRCUIT 20
  3. 1 SYNOPSIS 20
  3. 2 CONTROL LSI (IS415) 21
  3. 3 MODE and MECHANISM DRIVE 22
  3. 4 CIRCUIT EXPLANATION 23
4. TAPE DECK REC/P.B AMP 28
  4. 1 SYNOPSIS 28
  4. 2 CIRCUIT EXPLANATION 29
5. TOUCH CONTROL CIRCUIT 37
  5. 1 SYNOPSIS 37
  5. 2 TOUCH SENSER IC 38
  5. 3 CIRCUIT EXPLANATION 40
6. RECORD PLAYER 43
  6. 1 SYNOPSIS 43
  6. 2 ARM MOTOR DRIVE and SOLENOID CONTROL 44
  6. 3 RECORD SIZE DETECT CIRCUIT 44
  6. 4 AUTO RETURN DETECT CIRCUIT 45
  6. 5 AUTO SPEED DETECT CIRCUIT 46
  6. 6 PLAYER CONTROL CIRCUIT 47
  6. 7 BEHAVIORS OF CONTROL CIRCUIT 51
7. IC GATE INPUT/OUTPUT FUNCTION TABLE (LEVEL) 52

1. PRE AMP/POWER AMP/POWER SUPPLY (Refer to Figures 8–1 to 15–1)

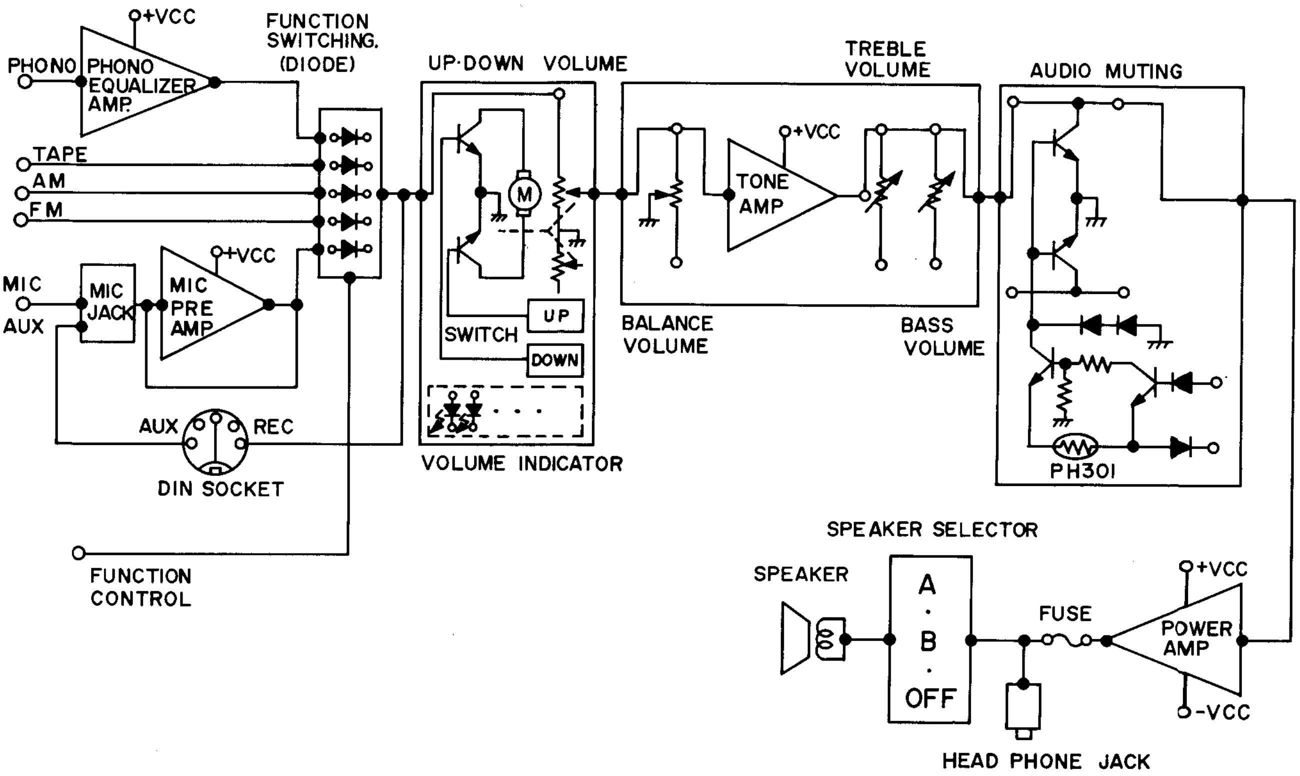

+VCC
PHONO
PHONO EQUALIZER AMP
FUNCTION SWITCHING. (DIODE)
UP·DOWN VOLUME
TREBLE VOLUME
AUDIO MUTING
TAPE
AM
FM
MIC
AUX
MIC JACK
MIC PRE AMP
M
TONE AMP
SWITCH
UP
DOWN
BALANCE VOLUME
BASS VOLUME
AUX
REC
DIN SOCKET
VOLUME INDICATOR
PH301
FUNCTION CONTROL
SPEAKER SELECTOR
SPEAKER
A
B
OFF
FUSE
POWER AMP
-VCC
HEAD PHONE JACK

Figure 8–1

1.1 SYNOPSIS (Refer to Figure 8)

- The input source consists of TAPE, PHONO, MIC/AUX, FM and AM terminals; out of them, inputs to the PHONO and MIC terminals are, respectively via the equalizer amplifier and microphone amplifier, to their respective function circuits.
- The function switching circuit is composed of the diode (IS1555) which serves as a switching element.
- The volume control is based on motor drive system and it is provided with the volume indicator (LED) telling its position over the range from "MIN" to "MAX". Coming out of the volume control, the signal is passed on, through the next balance control, to the tone control amplifier. Then the signal output from the tone control amplifier is supplied to the power amplifier via the audio muting circuit. Going out of the power amplifier, the signal enters both the headphone jack and speaker selector: the speaker selector allows three kinds of the speaker selection, "A", "B" or "A+B".

1. 2 CIRCUIT COMPOSITION

1. 2. 1 Power Amplifier Circuit (Refer to Figure 9–1)

The power amplifier circuit includes IC (STK-082) which is based on 2-power supply system and it is an all-stage directly coupled circuit where the input stage is of a differential amplifier circuit and the output stage, of a pure complementary circuit, thus assuring a very lowered distortion factor and better frequency characteristic.

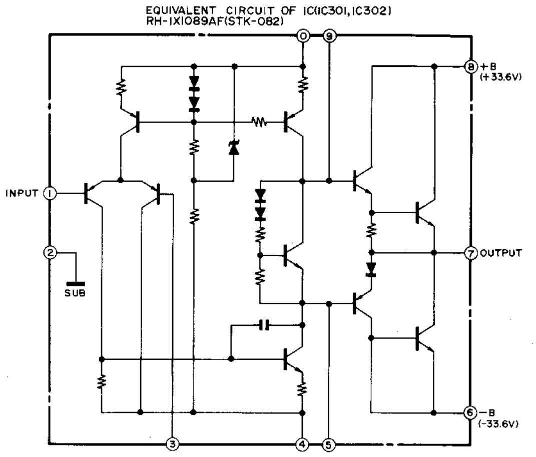

EQUIVALENT CIRCUIT OF IC(IC301,IC302)
RH-IX1089AF(STK-082)
INPUT ①
②
SUB
③
④
⑤
⑥ –B (–33.6V)
⑦ OUTPUT
⑧ +B (+33.6V)
⑨
⓪

Figure 9–1

1. 2. 2 Tone Control Circuit (Refer to Figure 9–2)

The tone control amplifier is made of a low-noise, low-distortion IC; the configuration of a C-R type tone control circuit can meet the frequency range from 100 Hz to 10 kHz (± 10 dB).

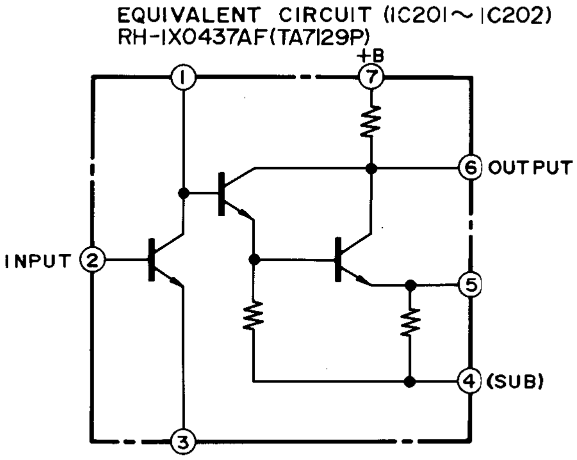

EQUIVALENT CIRCUIT (IC201~IC202)
RH-IX0437AF(TA7129P)
+B
①
⑦
⑥ OUTPUT
INPUT ②
⑤
④ (SUB)
③

Figure 9–2

1. 2. 3 UP/DOWN Volume Control Circuit

The UP/DOWN volume control circuit comprises 6 transistors, 5 diodes, 7 LED's, volume control and motor. The UP/DOWN operation depends upon a motor drive system; the volume regulation is achieved just by lightly pushing the UP/DOWN switch and the volume indication (LED) is designed to show 7 degrees of the volume amount.

1. 2. 4 Function Switching Circuit

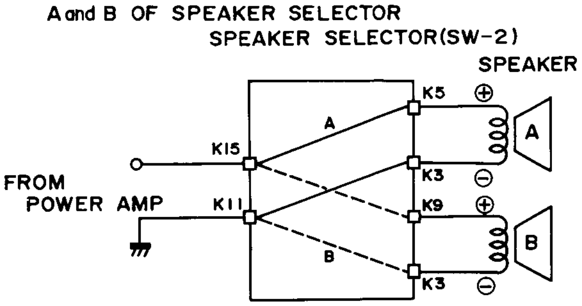
The function switching circuit is based on a diode-matrix design and it provides switching operation with the digital signal generated by the function selector switch when set at any of its positions.

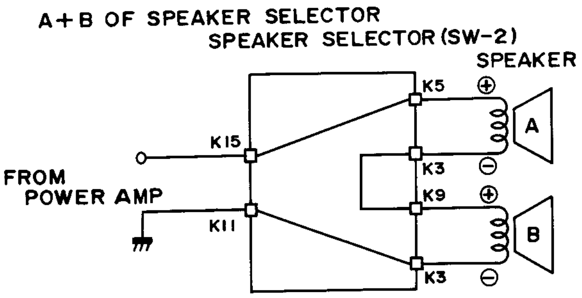
1. 2. 5 Audio Muting Circuit

The audio muting circuit is so designed that it begins to function when the stand-by switch is turned on or off, or the tape deck gets in any of the modes STOP/FF/REW/APSS-FWD/APSS-REW or STOP-PAUSE: the result is that possible generation of noises and abnormal temperature increase of the heat sink plate at that time can be eliminated.

1. 2. 6 Speaker Selector Circuit (Refer to Figure 10)

The speaker selector circuit can be effective in 4 positions, A/B/A+B and OFF any of which can be chosen by the switch (SW-2).


A and B OF SPEAKER SELECTOR
SPEAKER SELECTOR(SW-2)
SPEAKER
K5 ⊕
A
K15
FROM
POWER AMP
K11
K3 ⊖
K9 ⊕
B
K3 ⊖


A+B OF SPEAKER SELECTOR
SPEAKER SELECTOR (SW-2)
SPEAKER
K5 ⊕
A
K15
FROM
POWER AMP
K11
K3 ⊖
K9 ⊕
B
K3 ⊖

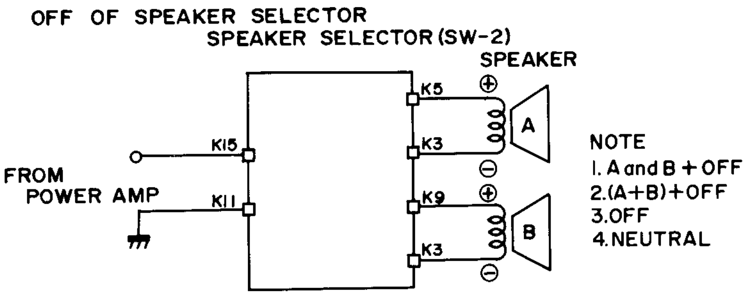
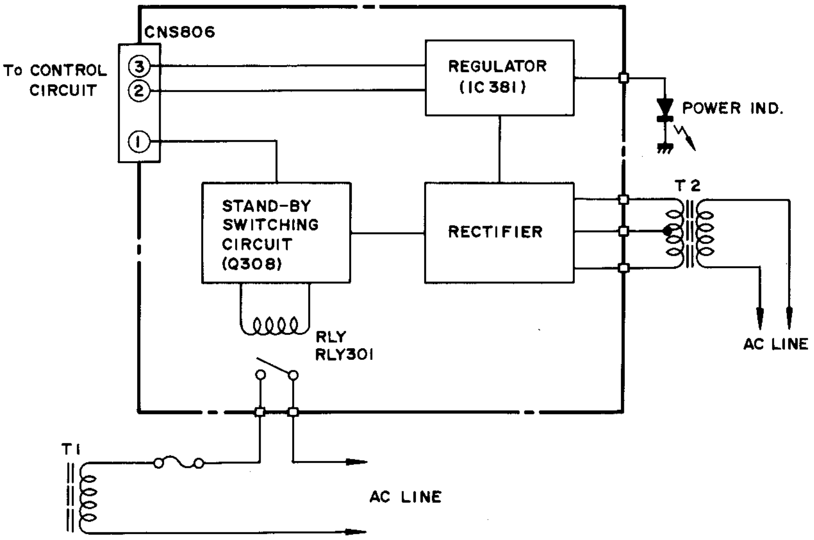

OFF OF SPEAKER SELECTOR
SPEAKER SELECTOR (SW-2)
SPEAKER
K5 ⊕
A
K15
FROM
POWER AMP
K11
K3 ⊖
K9 ⊕
B
K3 ⊖
NOTE
1. A and B + OFF
2.(A+B)+OFF
3.OFF
4.NEUTRAL

Figure 10—1

1. 2. 7 Power Supply and Sub Power Supply (Refer to Figure 11)


CNS806
To CONTROL CIRCUIT
③
②
①
REGULATOR (IC381)
POWER IND.
T2
STAND-BY SWITCHING CIRCUIT (Q308)
RECTIFIER
RLY RLY301
AC LINE
T1
AC LINE

PRE-HEATING, BLOCK DIAGRAM

Figure 11—1

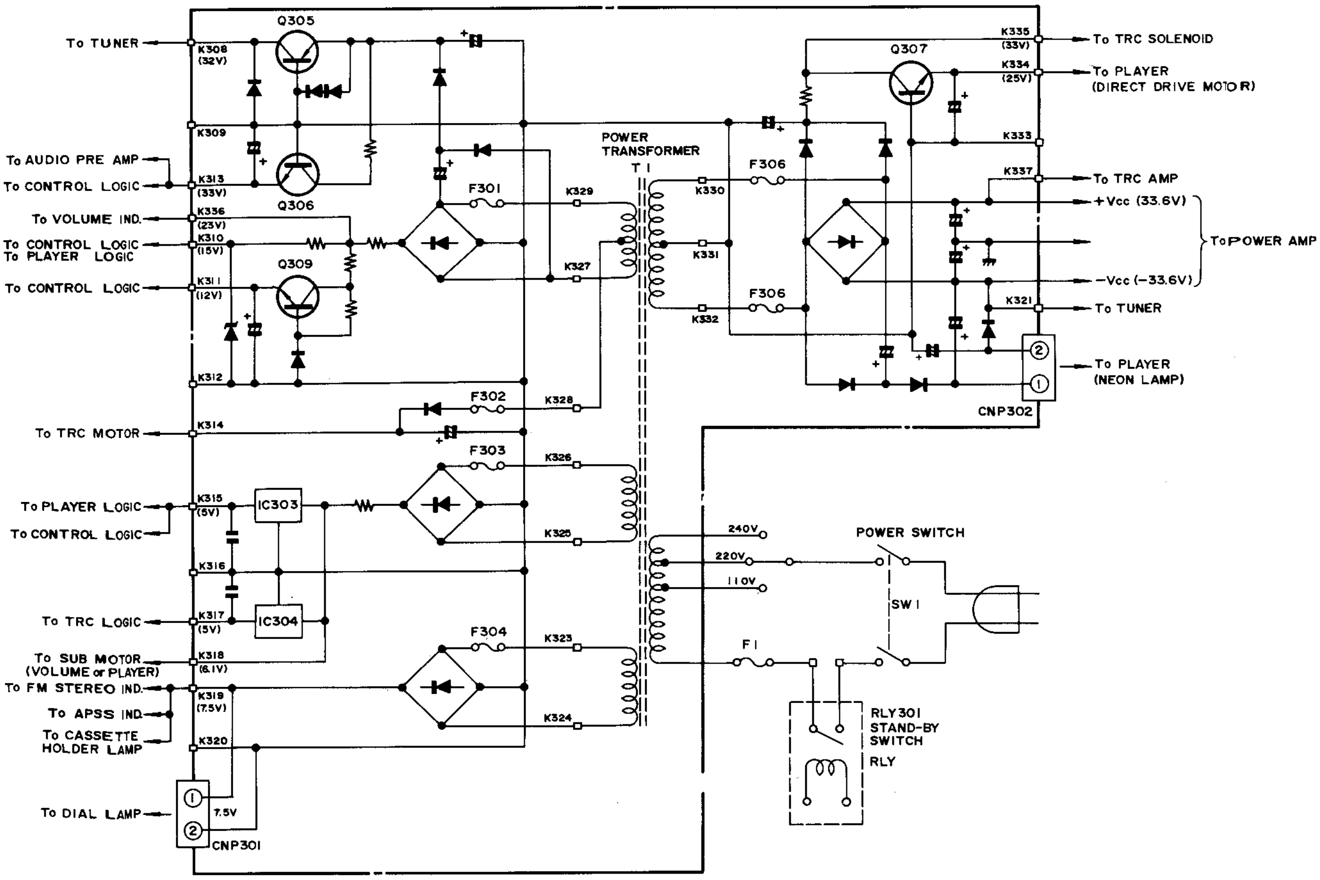

Q305
To TUNER
K308 (32V)
K309
To AUDIO PRE AMP
To CONTROL LOGIC
K313 (33V)
Q306
To VOLUME IND.
K336 (23V)
To CONTROL LOGIC
To PLAYER LOGIC
K310 (15V)
To CONTROL LOGIC
K311 (12V)
Q309
K312
F301
K329
K327
POWER TRANSFORMER
T1
F302
K328
To TRC MOTOR
K314
F303
K326
To PLAYER LOGIC
To CONTROL LOGIC
K315 (5V)
IC303
K325
K316
To TRC LOGIC
K317 (5V)
IC304
F304
K323
To SUB MOTOR (VOLUME or PLAYER)
K318 (6.1V)
To FM STEREO IND.
K319 (7.5V)
To APSS IND.
To CASSETTE HOLDER LAMP
K320
K324
To DIAL LAMP
①
②
7.5V
CNP301
Q307
K335 (33V)
To TRC SOLENOID
K334 (25V)
To PLAYER (DIRECT DRIVE MOTOR)
K333
K330
F306
K337
To TRC AMP
+Vcc (33.6V)
To POWER AMP
K331
−Vcc (−33.6V)
F306
K332
K321
To TUNER
②
①
To PLAYER (NEON LAMP)
CNP302
240V
220V
110V
POWER SWITCH
SW1
F1
RLY301 STAND-BY SWITCH
RLY

Figure 11—2

1. 3 CIRCUIT EXPLANATION

1. 3. 1 **Function Switching Circuit** (Refer to Figure 12)

The function switching circuit, with the assistance by the diode matrix circuit begins to operate with the digital signal caused by the touch control circuit, so that it can find out what type of input has been applied to the set.

- In the case of "PHONO" input (at L-channel)

When the touch button coupled with the touch control circuit is touched, the IC701, Q801 and CNS202 ④ are energized in this order resulting in that the potential at the terminal ④ of CNP-202 is changed from 0 V to approx. 33 V and this condition goes on. This voltage (33 V) is applied via the R219 and R229 to the D201 which will be thus biased in the forward direction to be turned on: the result is that a current flows, through the R295, in the base of Q207. With the D201 turned on, the signal coming out of the phono equalizer amplifier IC201 is passed on to the base of Q207 via the C223, then to be supplied to the next-stage volume control through the C231, and to the record amplifier of tape deck through the CNS504.

C218: Serves to absorb switching noises possibly caused when the switch is turned on.

D211: Serves to assure a faster cutting out of the circuit when the switch is turned off.

Q207: Serves as a buffer amplifier to prevent impedance variations possibly caused in the succeeding stages.

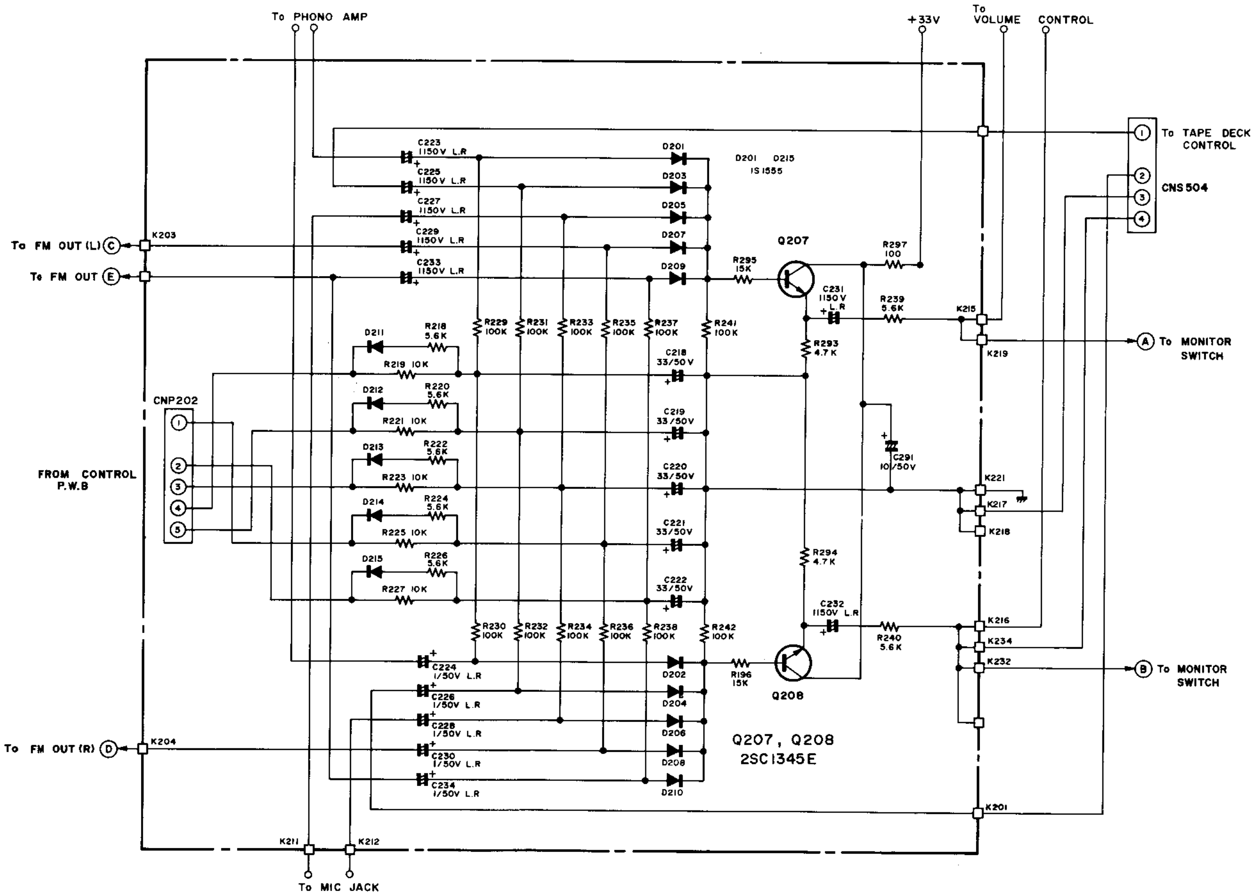

To PHONO AMP
+33V
To VOLUME CONTROL
To TAPE DECK CONTROL
CNS504
To MONITOR SWITCH
To MONITOR SWITCH
To FM OUT (L)
To FM OUT
To FM OUT (R)
FROM CONTROL P.W.B
CNP202
To MIC JACK
D201 D215 1S1555
Q207
Q208
Q207, Q208 2SC1345E
C223 1/50V L.R
C225 1/50V L.R
C227 1/50V L.R
C229 1/50V L.R
C233 1/50V L.R
C224 1/50V L.R
C226 1/50V L.R
C228 1/50V L.R
C230 1/50V L.R
C234 1/50V L.R
C218 33/50V
C219 33/50V
C220 33/50V
C221 33/50V
C222 33/50V
C231 1/50V L.R
C232 1/50V L.R
C291 10/50V
R218 5.6K
R219 10K
R220 5.6K
R221 10K
R222 5.6K
R223 10K
R224 5.6K
R225 10K
R226 5.6K
R227 10K
R229 100K
R231 100K
R233 100K
R235 100K
R237 100K
R241 100K
R230 100K
R232 100K
R234 100K
R236 100K
R238 100K
R242 100K
R295 15K
R196 15K
R297 100
R239 5.6K
R240 5.6K
R293 4.7K
R294 4.7K
D201 D203 D205 D207 D209
D202 D204 D206 D208 D210
D211 D212 D213 D214 D215
K201 K203 K204 K211 K212 K215 K216 K217 K218 K219 K221 K232 K234

Figure 12 —1

1. 3. 2 UP/DOWN Volume Control and Indicator Circuit

(Refer to Figure 13)

The right-and-left du'plex volume control circuit is coupled with the low-speed DC motor: the design is that the UP/DOWN touch switch is to rotate the motor to right or to left, thereby enabling the volume control. This volume control circuit is electrically interlocked with the 7-point changeable switch and MIN/MAX detector switch, so that either of the 7 LED's lights up according to the degree of volume amount which has been selected by the listener.

■ **UP/DOWN Motor Control** (Refer to Figure 13)

- In the case of UP position:
  When the switch SW201 (UP) is set at "ON", a potential of +6 V is applied to the R262 and the base of Q204 is thus biased so that this transistor is turned on: the result is that the potential at the point Ⓐ of the collector becomes lowered to nearly 0 V (at the time, the Q202 is kept at "OFF").
  As a result, the base voltage of Q201 decreases through the R264 so that this transistor will eventually be turned on, thereby applying the voltage to the point Ⓑ . Under this condition, it is so designed that a current is applied to the motor in the direction from the point Ⓑ to Ⓐ : the result is that the motor can rotate in such a way as to make the volume be changed from "MIN" to "MAX".
  The motor is stopped as soon as the switch SW201 (UP) is moved to "OFF" from "ON" position.
- In the case of DOWN position:
  When the switch SW202 (DOWN) is set at "ON", the resultant current is applied to the motor in the direction from the point Ⓐ to Ⓑ which is reverse to that in the case where the switch SW201 (UP) is set at "ON", so that the motor rotation can make the volume be changed from "MAX" to "MIN".
- In the case of the volume control being set at "MAX" position:
  The switch electrically interlocked with the volume control is set at "Maximum End" position, a potential of 24 V is applied via the common terminal to the R271 so that the Q206 will be turned on while the Q204, off: the result is that the motor doesn't tend to rotate even if the switch SW201 (UP) is set at "ON".
- In the case of the volume control being set "MIN" position:
  The switch electrically interlocked with the volume control is set at "Minimum End" position, and the Q205 is turned on while the Q203, off: the result is that the motor doesn't tend to rotate even if the switch SW202 (DOWN) is set at "ON".
- In the case of the two switches UP and DOWN being depressed at the same time:
  Even if one tries to push these two switches just simultaneously, it is inevitable that there will arise a slight time lag between them to be pushed. Therefore, one of the two which has been pushed first is sure to be turned on and another, kept off: the motor can thus rotate depending upon only one of the two switches.

■ **Indicator Circuit**

The volume control is electrically interlocked with the seven switch terminals No. 1 to No. 7 and these terminals are further coupled to the seven LED's which will light up over the range from "MIN" to "MAX" proportionally to the degree of volume amount.

With the switch set at the position ① , a current caused at the common terminal runs through the R266 to D216 so that the D216 will light up. With the switch set at the position ② , a current produced at the common terminal flows in the R267, D217 and D216 in this order so that both the D216 and D217 will light up.

Since it is so designed that a current of 7 mA runs in the R266, R270, R203 and R201, there develops a voltage of 2 V at each of the D216 to D222: the result is that if all of the seven LED's light up at a time, there appears a total voltage of 14 V at the anode of D222.

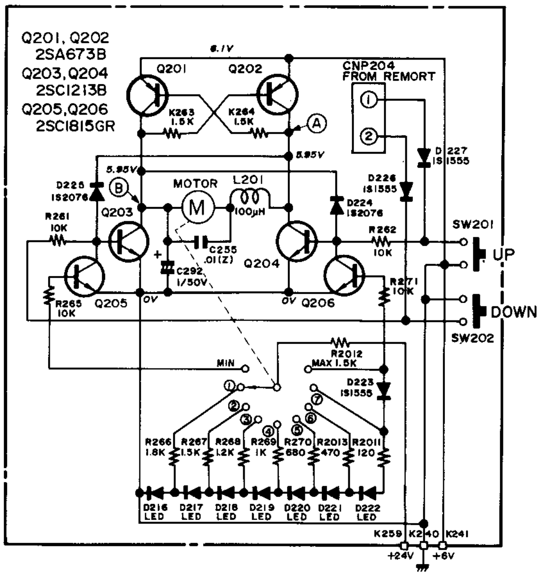

Q201, Q202
2SA673B
Q203, Q204
2SC1213B
Q205, Q206
2SC1815GR
6.1V
Q201
Q202
CNP204
FROM REMORT
①
②
K263
1.5K
K264
1.5K
Ⓐ
5.95V
5.95V
D227
1S1555
D225
1S2076
Ⓑ
MOTOR
M
L201
100μH
D226
1S1555
D224
1S2076
R261
10K
Q203
R262
10K
SW201
UP
C255
.01(Z)
C292
1/50V
Q204
R271
10K
R265
10K
Q205
0V
0V
Q206
DOWN
SW202
R2012
MAX 1.5K
MIN
D223
1S1555
①
②
③
④
⑤
⑥
⑦
R266
1.8K
R267
1.5K
R268
1.2K
R269
1K
R270
680
R2013
470
R2011
120
D216
LED
D217
LED
D218
LED
D219
LED
D220
LED
D221
LED
D222
LED
K259
K240
K241
+24V
+6V

Figure 13—1

1. 3. 3 Audio Muting Circuit (Refer to Figure 15)

- When the stand-by switch is set at "ON", a current runs via the R320 in the bases of Q301 and Q302 so that these transistors are turned on. As a result, the signal of the tone control amplifier formed by the IC205 and IC206 is stopped to be applied to the input terminal of the power amplifier consisting of the IC301 and IC302.
- When the power switch is set at "ON", a current flows in the R324 and C315 and the base voltage of Q303 therefore increases progressively until this transistor will be turned on, resulting in a collector current of it. Accordingly, there arises more dropping of the voltage at the R320 so that the collector voltage of Q303 becomes negative and simultaneously a current running in the bases of Q301 and Q302 is stopped: the result is that these transistors Q301 and Q302 are both turned off allowing the signal to be passed on to the power amplifier IC301 and IC302.
- When the stand-by switch is set at "OFF", the negative voltage at the C347 is made 0 V sharply so that the emitter voltage of Q303 increases and the collector voltage thus becomes positive to generate a current to run in the bases of Q301 and Q302: the result is that these two transistors Q301 and Q302 are turned off so that no signal enters the power amplifier.
  The Q304 is for the purpose to make the charged voltage at the C315 be discharged when the standby switch is set at "OFF".
- If the heat sink plate of IC301 and IC302 tends to over-heat, there develops much resistance at the PH301 abruptly, a current runing from the collector to emitter of Q303 is reduced and the collector voltage therefore becomes positive so that the transistors Q301 and Q302 are turned on: the result is that any signal is prevented from entering the power amplifier thereby eliminating an excessive temperature increase of the heat sink plate.
- When the tape deck is operated in either of the modes STOP, FF, REW, APSS FW/REV, STOP/PAUSE, the signal coming out of the tape deck logic section is passed on through the K307, D331 and D332 to the Q301 and Q302 so that these transistors are turned on, thus preventing possible noises from going to the power amplifier.

1. 3. 4 Voltage Doubler Rectifier Circuit (For Strobo Illumination) (Refer to Figure 14)

When the power transformer (T_1) is at one-half cycle where its output terminal K330 is negative-related to that K331, it charges the C304 up to the AC input maximum value (Em) through the C307. Besides, when it is at another one-half cycle where the output terminal K331 is positive-related with that K332, it charges the C346 up to the value of addition of the charge voltage (Fm) of C340 and the total AC input (2 Em).

$$E_p = 2\,Em + B$$

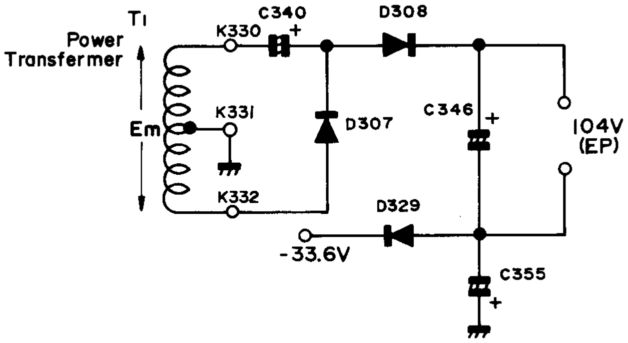


Figure 14—1

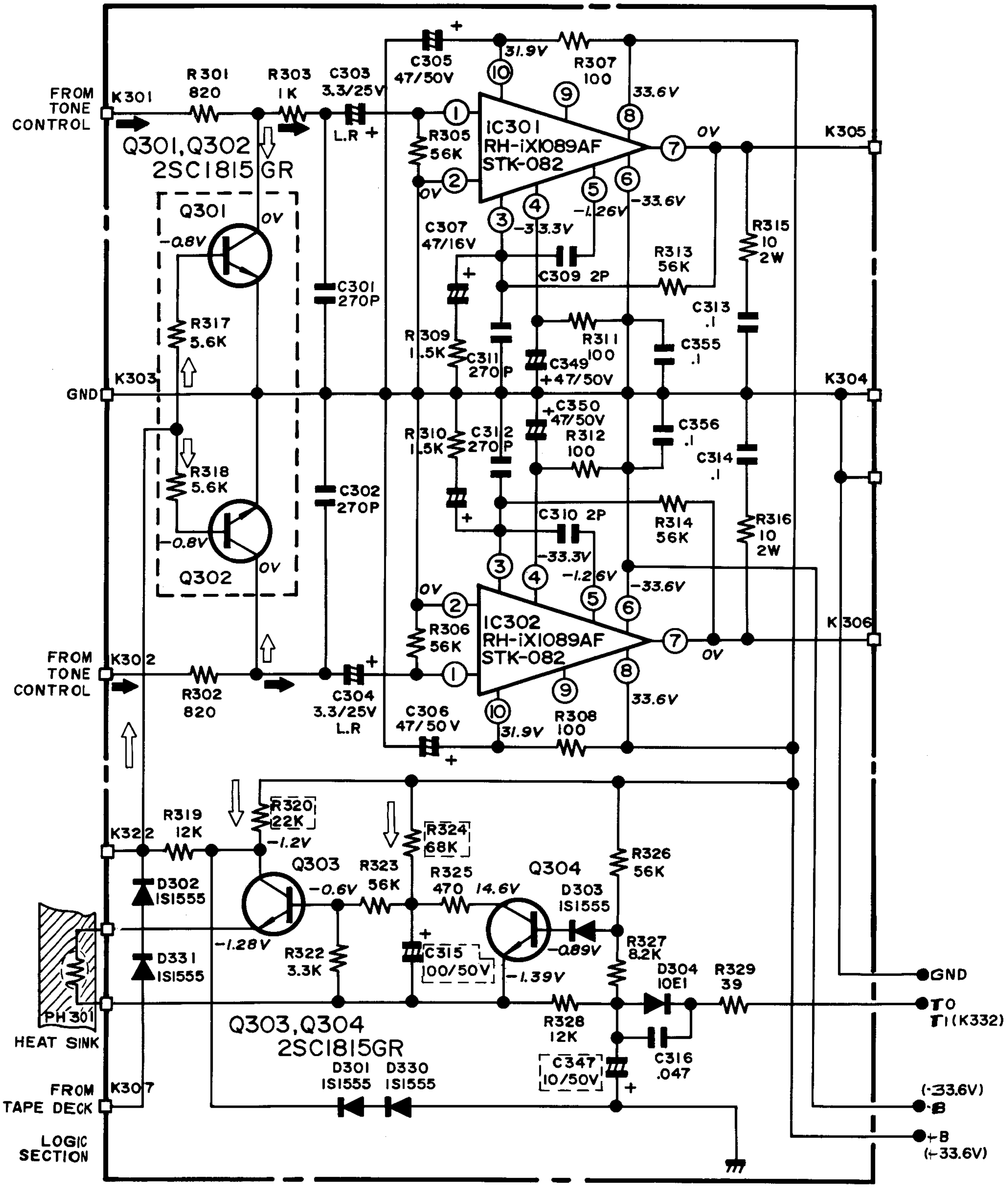

FROM TONE CONTROL
K301
R301 820
R303 1K
C303 3.3/25V
L.R +
C305 47/50V
31.9V
R307 100
33.6V
IC301 RH-iX1089AF STK-082
R305 56K
0V
-33.3V
-1.26V
-33.6V
K305
Q301,Q302 2SC1815GR
Q301
-0.8V
0V
C301 270P
C307 47/16V
C309 2P
R313 56K
R315 10 2W
R317 5.6K
R309 1.5K
C311 270P
C349 +47/50V
R311 100
C313 .1
C355 .1
K303
GND
K304
C350 47/50V
R312 100
C356 .1
C314 .1
R318 5.6K
R310 1.5K
C312 270P
C302 270P
C310 2P
R314 56K
R316 10 2W
-0.8V
Q302
0V
-33.3V
-1.26V
-33.6V
IC302 RH-iX1089AF STK-082
R306 56K
K306
0V
FROM TONE CONTROL
K302
R302 820
C304 3.3/25V L.R
C306 47/50V
31.9V
R308 100
33.6V
R319 12K
R320 22K
-1.2V
R324 68K
K322
Q303
R323 56K
R325 470
14.6V
Q304
R326 56K
D302 1S1555
-0.6V
D303 1S1555
-1.28V
R322 3.3K
C315 100/50V
-0.89V
R327 8.2K
D331 1S1555
-1.39V
D304 10E1
R329 39
PH301
R328 12K
HEAT SINK
Q303,Q304 2SC1815GR
C347 10/50V
C316 .047
FROM TAPE DECK
K307
D301 1S1555
D330 1S1555
LOGIC SECTION
GND
TO T1(K332)
(-33.6V) -B
+B (+33.6V)

Figure 15—1

2. TUNER SECTION

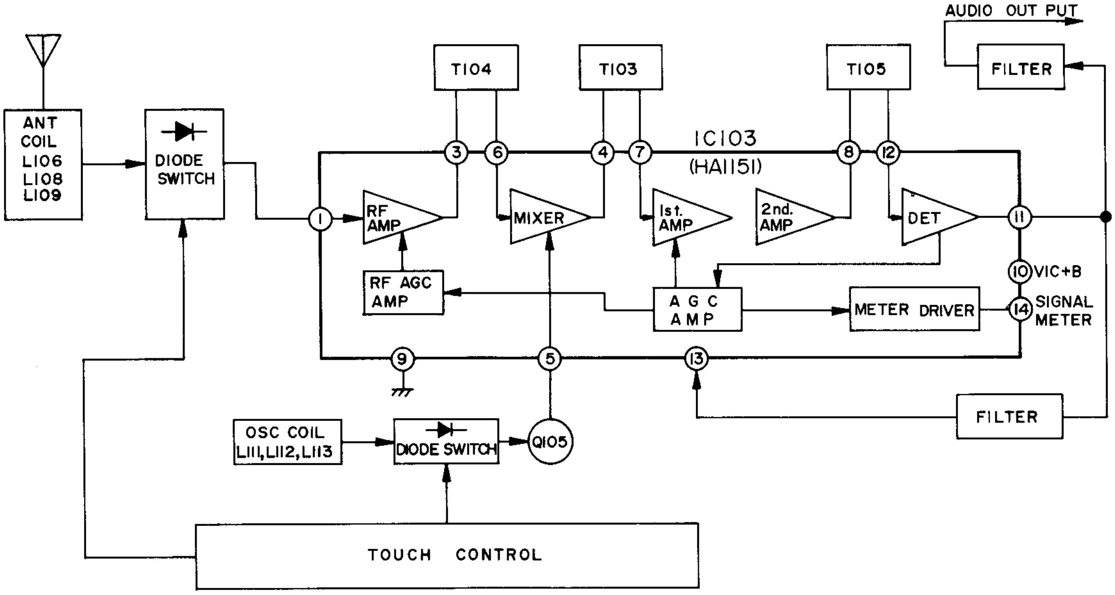

AUDIO OUT PUT
FILTER
T104
T103
T105
ANT
COIL
L106
L108
L109
DIODE
SWITCH
IC103
(HA1151)
③
⑥
④
⑦
⑧
⑫
①
RF
AMP
MIXER
1st.
AMP
2nd.
AMP
DET
⑪
⑩ VIC+B
⑭ SIGNAL
METER
RF AGC
AMP
A G C
A M P
METER DRIVER
⑨
⑤
⑬
FILTER
OSC COIL
L111,L112,L113
DIODE SWITCH
Q105
TOUCH CONTROL

Figure 16–1

2. 1 AM (LW, MW, SW) SECTION (Refer to Figure 16)
This signal selection depends upon the switching circuit making use of diode - - - this diode operation is more reliable than with the mechanical-basis parts, in particular for a number of signal selections like in this type of tuner.

The fundamental of this switching is that the diode provides a sharp rise-up characteristic in the forward direction at one time and a cut-off characteristic in the backward direction at another time.

Coming out of the touch control circuit L106, L108 and L109, AM signal enables the diode switching circuit to function leading to a selection of the mode (LW, MW or SW), and then the resultant signal enters the input terminal ① of the RF amplifier IC103. The signal thus amplified by the RF amplifier is passed on through the T104 (IF trap) to the input terminal of the mixer, where the AM RF signal is converted to IF signal. The IF signal is applied via the T103 to the 1st and 2nd amplifier, then detected by the T105 (IFT coil) so that it appears at the output terminal ⑪ of IC103 entering the audio circuit through the low-pass filter.

2. 1. 1 AM Antenna Circuit (Refer to Figure 17–1)
In MW reception the D112 and D115 get in conduction and there develops the same AC potential as the earth at the points Ⓐ and Ⓑ. Therefore the L108 (MW antenna coil) and VC101 (variable capacitor) can form a resonant circuit resulting in a reception of MW signals (the SW antenna coil L106 at the time has no influence on MW/LW reception).

The signal thus received is applied to the input terminal ① of IC103 through the C139 and L115: the D113 and D114 are both opened allowing no signal to run therein.

This process of receiving MW signals holds true of SW/LW reception, also.

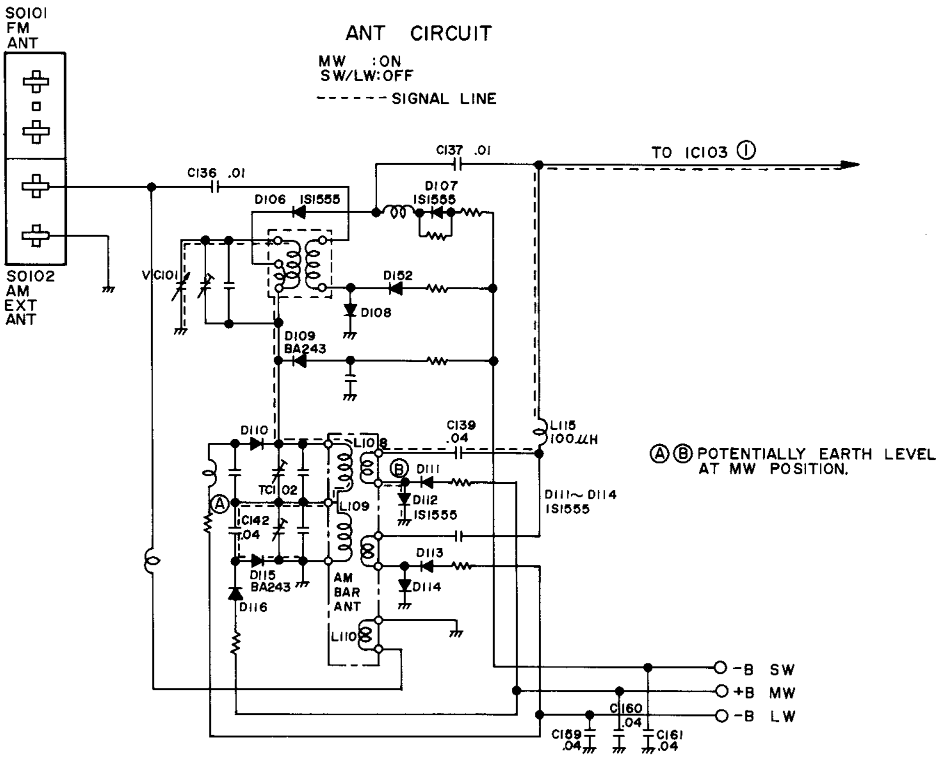

ANT CIRCUIT
MW :ON
SW/LW:OFF
------SIGNAL LINE
SO101
FM
ANT
SO102
AM
EXT
ANT
C136 .01
C137 .01
TO IC103 ①
D106 1S1555
D107
1S1555
VC101
D152
D108
D109
BA243
D110
TC102
C142
.04
D115
BA243
D116
L108
L109
AM
BAR
ANT
L110
C139
.04
Ⓑ D111
D112
1S1555
D113
D114
L115
100μH
D111~D114
1S1555
ⒶⒷ POTENTIALLY EARTH LEVEL
AT MW POSITION.
Ⓐ
-B SW
+B MW
-B LW
C159
.04
C160
.04
C161
.04

Figure 17–1

2. 1. 2 AM Oscillation/IF Circuit (Refer to Figure 17–2)

Switching operation by the oscillator circuit is the same as in the AM antenna circuit shown in Figure 17–1.

In MW reception, the D124 and D126 get in conduction while the D121 and D129 are kept open: at the time, We can assume that the R156 remains open because of its higher resistance (1 M ohm). Accordingly, only the L112 becomes alive to make MW reception be feasible thanks to the diode switching operation. The D133 and D134 are so designed as to operate as a damper against the L113 during MW reception, assuring a more stabilized MW oscillation.

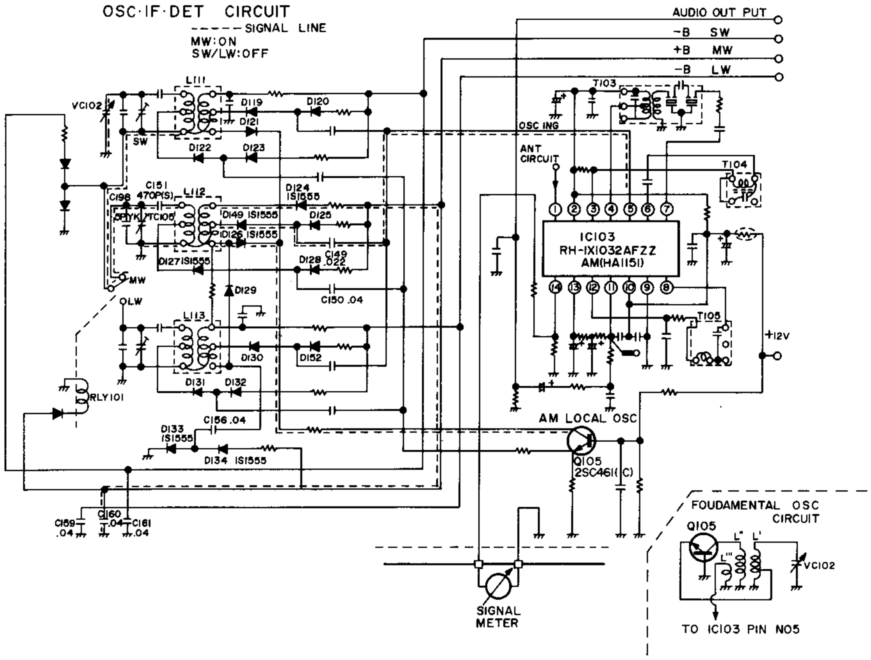

OSC·IF·DET CIRCUIT
------SIGNAL LINE
MW:ON
SW/LW:OFF
AUDIO OUT PUT
-B SW
+B MW
-B LW
L111
VC102
D119
D120
D121
SW
D122
D123
C151
470P(S)
L112
C198
TC105
D124
1S1555
D149 1S1555
D125
D126 1S1555
D127 1S1555
D128 .022
C149
MW
LW
D129
C150 .04
L113
D130
D152
D131
D132
RLY101
C156 .04
D133
1S1555
D134 1S1555
C159
.04
C160
.04
C161
.04
T103
OSC ING
ANT
CIRCUIT
T104
IC103
RH-IX1032AFZZ
AM(HA1151)
① ② ③ ④ ⑤ ⑥ ⑦
⑭ ⑬ ⑫ ⑪ ⑩ ⑨ ⑧
T105
+12V
AM LOCAL OSC
Q105
2SC461(C)
SIGNAL
METER
FOUDAMENTAL OSC
CIRCUIT
Q105
L'
L''
VC102
TO IC103 PIN NO5

Figure 17–2

2.2 FM SECTION (Refer to Figure 18)

FM reception is based on the presettable memory function so that it is started instantly when any of the touch switches U_1 to U_7 is pushed. Coming out of the touch control circuit, the MANUAL/Channel (U_1, U_2) selection signal is converted into the corresponding voltage by the potential meter, then to be applied to the variable capacitance diode (varicap) of the antenna/oscillator circuit. Being picked up by the antenna; RF signal is applied to the antenna circuit where the necessary component is taken out and it is then amplified by the RF amplifier. Then the signal is converted into IF signal through the mixer, further to be supplied to the IF amplifier (IC101) where it is amplified and detected and finally it is supplied to the multiplex circuit (IC102) becoming stereo audio signal to enter the audio amplifier.
The IF amplifier IC101 consists of 3-stage amplifier/limiter, 3-stage meter-driving detector circuit and quadrature detector circuit.
The 0 V switch is provided to prevent possible noises (shock noises) from occurring when the muting switch is turned on or off.

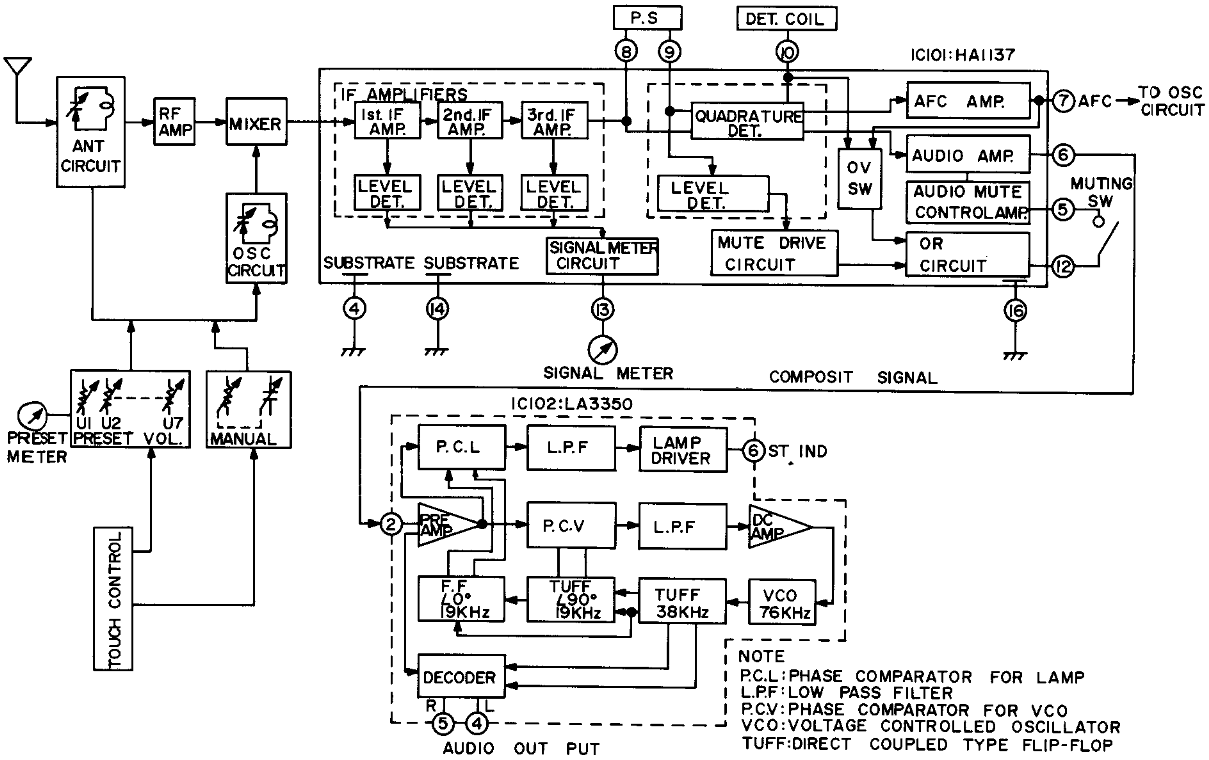

P.S
DET. COIL
8
9
10
IC101:HA1137
ANT CIRCUIT
RF AMP
MIXER
OSC CIRCUIT
IF AMPLIFIERS
1st. IF AMP.
2nd. IF AMP.
3rd. IF AMP.
LEVEL DET.
LEVEL DET.
LEVEL DET.
QUADRATURE DET.
LEVEL DET.
OV SW
AFC AMP.
AUDIO AMP.
AUDIO MUTE CONTROL AMP.
OR CIRCUIT
MUTE DRIVE CIRCUIT
SIGNAL METER CIRCUIT
SUBSTRATE
SUBSTRATE
7 AFC
TO OSC CIRCUIT
6
5
12
MUTING SW
4
14
13
16
SIGNAL METER
COMPOSIT SIGNAL
PRESET METER
U1 U2 U7
PRESET VOL.
MANUAL
TOUCH CONTROL
IC102:LA3350
P.C.L
L.P.F
LAMP DRIVER
6 ST. IND
2
PRE AMP
P.C.V
L.P.F
DC AMP
F.F ∠0° 19KHz
TUFF ∠90° 19KHz
TUFF 38KHz
VCO 76KHz
DECODER
R
L
5
4
AUDIO OUT PUT
NOTE
P.C.L: PHASE COMPARATOR FOR LAMP
L.P.F: LOW PASS FILTER
P.C.V: PHASE COMPARATOR FOR VCO
VCO: VOLTAGE CONTROLLED OSCILLATOR
TUFF: DIRECT COUPLED TYPE FLIP-FLOP

Figure 18—1

2.2.1 **Quadrature Detector Circuit** (Refer to Figure 19)

The phase shifter is to tune the input signal to FM carrier by shifting its phase by $\pi/2$ with respect to the central frequency. The signal (called f_0) which has thus been delayed by $\pi/2$ in its phase will be used at the quadrature detector, serving as a switching signal.

Figure 19–3 reveals how this switching operation (demodulation) is carried out.

(a) In the case of the input frequency being matched to the f_0.

(b) In the case of the input frequency being lower than the f_0.

(c) In the case of the input frequency being higher than the f_0.

If there is found a deviation at the input frequency tuned by the phase shifter, it is subjected to FM detection.

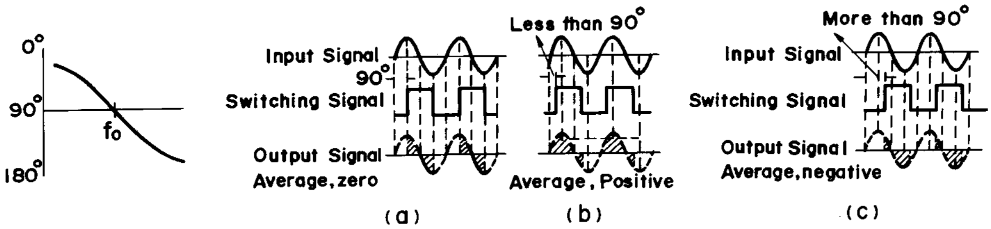
2.2.2 **PLL Multiplex Circuit** (Refer to Figure 18)

Behaviors of PLL (Phase Locked Loop)

When there is a phase difference of $\pi/2$ caused between the composite signal and 38 kHz signal, the stereo separation effect attains the maximum. Generation of 38 kHz signal is based on 78 kHz signal produced at the VCO: the latter signal is applied to the TUFF where it is made to be a 38 kHz signal.

The PLL system is provided so that it makes the phase difference between the composite signal and 38 kHz signal be of $\pi/2$.

Coming in the input terminal ② of IC102, the pilot signal (19 kHz) concerned with the composite signal is passed on through the preamplifier to the PCV where a switching operation occurs with the assistance by the 19 kHz which has been assured by the VCO. When this switching is locked, the output of PCV becomes zero and as the phase of VCO varies, the output (positive) of PCV becomes negative; this variation is amplified by the DC amplifier to control the VCO, thereby making zero the output of PCV. It is in this way that during demodulation of the stereo broadcasting signals, the input signal undergoes a 38 kHz phase control to become a switching signal to be applied to the decoder circuit.


0°
90°
180°
fo
Input Signal
90°
Switching Signal
Output Signal
Average, zero
Less than 90°
Average, Positive
More than 90°
Input Signal
Switching Signal
Output Signal
Average, negative

(a) (b) (c)

Figure 19–1

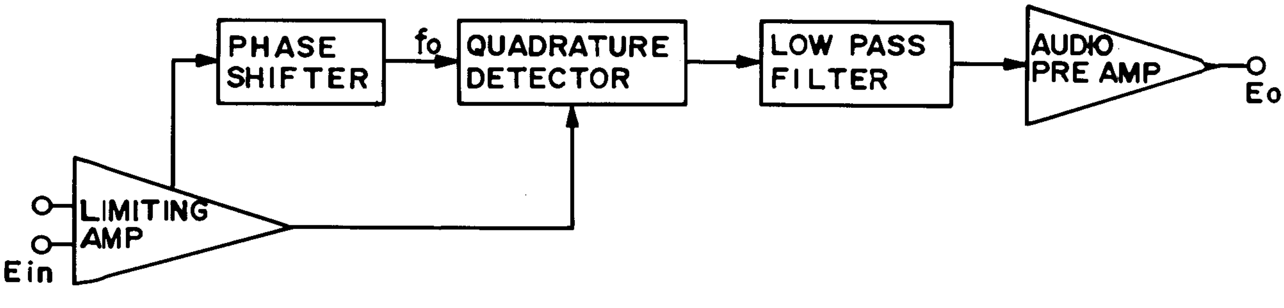

PHASE SHIFTER
fo
QUADRATURE DETECTOR
LOW PASS FILTER
AUDIO PRE AMP
Eo
LIMITING AMP
Ein

Figure 19–2

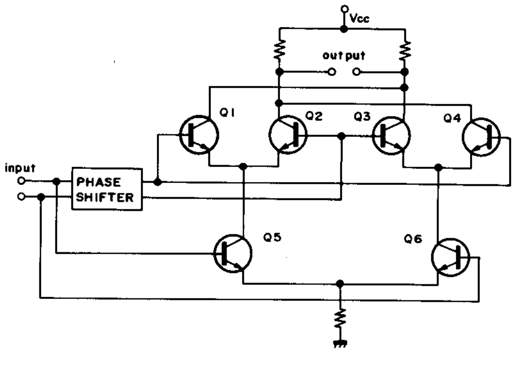

Vcc
output
Q1
Q2
Q3
Q4
input
PHASE SHIFTER
Q5
Q6

Figure 19–3

3. TAPE DECK LOGIC CONTROL CIRCUIT

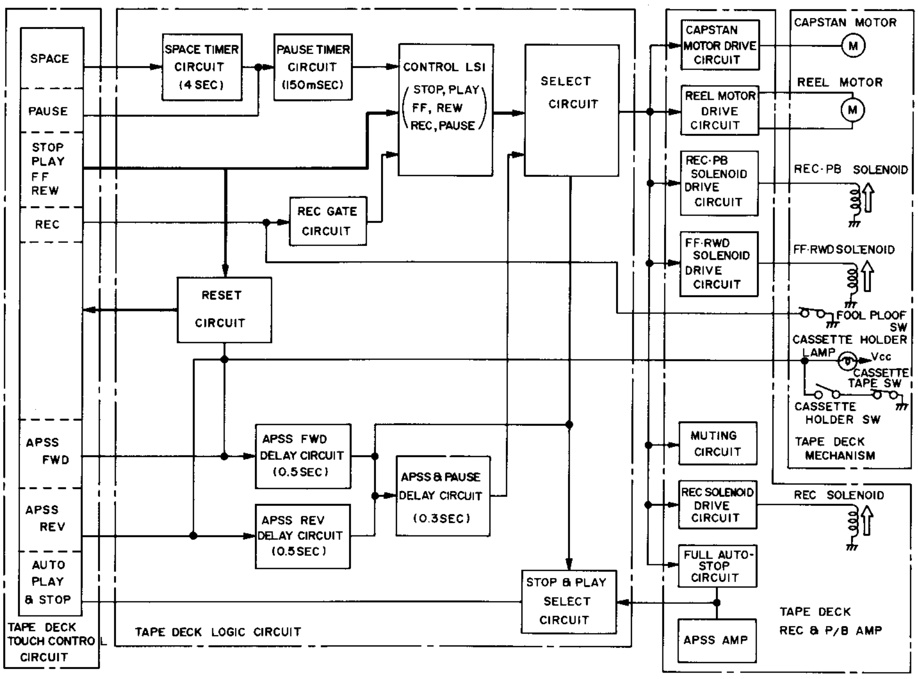

SPACE
PAUSE
STOP
PLAY
FF
REW
REC
APSS FWD
APSS REV
AUTO PLAY & STOP
TAPE DECK TOUCH CONTROL CIRCUIT
SPACE TIMER CIRCUIT (4 SEC)
PAUSE TIMER CIRCUIT (150mSEC)
CONTROL LSI (STOP, PLAY, FF, REW, REC, PAUSE)
SELECT CIRCUIT
REC GATE CIRCUIT
RESET CIRCUIT
APSS FWD DELAY CIRCUIT (0.5SEC)
APSS REV DELAY CIRCUIT (0.5SEC)
APSS & PAUSE DELAY CIRCUIT (0.3SEC)
STOP & PLAY SELECT CIRCUIT
TAPE DECK LOGIC CIRCUIT
CAPSTAN MOTOR DRIVE CIRCUIT
REEL MOTOR DRIVE CIRCUIT
REC·PB SOLENOID DRIVE CIRCUIT
FF·RWD SOLENOID DRIVE CIRCUIT
MUTING CIRCUIT
REC SOLENOID DRIVE CIRCUIT
FULL AUTO-STOP CIRCUIT
APSS AMP
CAPSTAN MOTOR
M
REEL MOTOR
M
REC·PB SOLENOID
FF·RWD SOLENOID
FOOL PLOOF SW
CASSETTE HOLDER LAMP
Vcc
CASSETTE TAPE SW
CASSETTE HOLDER SW
TAPE DECK MECHANISM
REC SOLENOID
TAPE DECK REC & P/B AMP

Figure 20–1

3.1 SYNOPSIS (Refer to Figure 20)

- Receiving the signal from the touch controls the logic control circuit mainly composed of the control ISI (IC415), which has a preset logic about the factors of time and sequence, is to energize the mechanical control circuit so that the tape deck gets in either of the modes STOP, PLAY, FF, REW, APSS-RWD/REV, STOP/PAUSE and PLAY/PAUSE.
- The control LSI (IC415) is to function according to either of the selected modes STOP, PLAY, REC and PAUSE: Receiving the signal from the touch control circuit, this LSI produces time-controlled signal to apply it to the select circuit. Another feature of the circuit is to prevent misoperation caused due to multiple inputs during the reception.
- The space timer circuit is so designed as to operate only when the tape deck is at REC mode; this time circuit receives the signal from the touch control circuit and delays its travel for about 5 seconds before applying it to the pause timer circuit. This time delay (about 5 seconds) is named a space time.
- The input signal to the control LSI during PAUSE mode is required to continue for more than 100 msec, as otherwise the circuit will operate mistakenly. For this purpose, the pause timer circuit is provided to enable the pulse to continue for 150 msec.
- The record gate circuit is an intermediate circuit to transfer the signal from the touch control circuit to the control LSI, regulating it to a proper level. It is noted that with an erase-proofed tape (to prohibit the recording), this gate circuit can cut off the record control signal since the fool proof switch detects the use of such a tape at that time.

The APSS FWD delay circuit is to delay the oncoming signal for 0.5 sec. in order for the other mechanisms to become free from misoperation. During REV mode, if the APSS FWD signal is generated by the touch control circuit to cancel the function of REV mode, this APSS FWD delay circuit begins to operate stopping the mechanism once and 0.5 sec. threafter, the signal will be supplied to the APSS and PAUSE delay circuit.

- The APSS and PAUSE delay circuit is provided to serve its role when there occur APSS and PAUSE operations at the same time; say, this circuit then is to control the REC/PB solenoid and FF/RWD solenoid alternately.
- The reset circuit is to produce reset signal to apply it to the touch control circuit, which is required to change Stop/Play/FF/REW to APSS FWD/APSS REV mode and vice versa, or from APSS FWD to APSS REV and vice versa.
- The select circuit is the one by which, coming out of the control LSI and APSS and pause relay circuit, the signal is applied to the mechanism drive circuit and control circuit depending upon its purpose.
- The STOP and PLAY select circuit is designed to function during APSS mode receiving program-to-program space signal: namely, it delivers PLAY or STOP signal to the touch control circuit according to whether the tape is subjected to APSS or APF operation. Besides, it also operates when the tape reaches the end so that it receives the pulse signal from the full auto stop circuit.

3. 2 CONTROL LSI CIRCUIT (Refer to Figure 21)

3. 2. 1 Control LSI Operation

- The IC 415 is composed mostly of C-MOS and it is made an open emitter type in order to provide much amount of output current for some output terminals (㉒, ㉑, ⑲, ⑱, ⑰, ⑯, ⑮). All of the input terminals (②, ③, ④, ⑤, ⑥, ⑦) are so designed as to function when the signal given is at low level. Fig. 21–1 represents input signal-to-output signal relation: out of those, the tape end output terminal becomes low level (off) only when it is given the signal but goes to high level each time any of the keys is pushed.
- Fig. 21–2 shows how the control LSI circuit can operate with input signal under the respective modes.
- For record operation, it is needed for the circuit to receive both REC and play input signals.
- Once the circuit is placed at pause mode, if the pause input is again given, the stop mode will, instead, be established. If there appears pause output under Play mode, Play/Pause mode will be established and if there develops again pause input, stop mode be established.
- Fig. 21–2 reveals the relation between each operation mode and its input. From this relation table it is possible to see how the mechanism circuit changes one operation mode to another when it receives a particular signal from the touch control circuit. Also it can been seen how one operation mode is changed to another when there appear stop signal and program-to-program space signal, coming from the record/playback amplifier of the tape deck.

○····· High Level OUTPUT

OUTPUT Signal \ INPUT Signal	STOP	FF	REW	PLAY	REC and PLAY	PAUSE		
						STOP	PLAY	REC/PLAY
PLAY				○	○			
REC					○			○
STOP		○	○	○	○	○	○	○
FF·REW		○	○					
PAUSE						○	○	○
MUT	○	○	○			○		
REW			○					
F·F		○						
TAPE·END	○	○	○	○	○	○	○	○
MODE					REC	PAUSE	PLAY/PAUSE	REC/PAUSE

Figure 21–1

MODE \ INPUT Signal	STOP	FF	REW	PLAY	PAUSE	REC PLAY
STOP	——	FF	REW	PLAY	PAUSE	REC/PLAY
F·F	STOP	——	REW	PLAY	——	REC/PLAY
REW	STOP	FF	——	PLAY	——	REC/PLAY
PLAY	STOP	FF	REW	——	PLAY/PAUSE	REC/PLAY
PAUSE	STOP	FF	REW	PLAY/PAUSE	STOP	REC/PAUSE
REC/PLAY	STOP	FF	REW	——	REC/PAUSE	——
REC/PAUSE	STOP	FF	REW	——	REC/PLAY	——
PLAY/PAUSE	STOP	FF	REW	——	PLAY	REC/PAUSE

Figure 21–2

3. 2. 2 Timing Chart [Control LSI (IC415)]

- Fig. 21–3 shows the operation timing chart of the IC415.
- T_1 is a delay time of the output signal against the input signal which is provided for a transfer from Stop mode to Play, FF or REW mode, a transfer from Play mode to FF or REW mode, or a transfer from FF mode to REW mode. With this provision of a delay time, one mode, if transferred to another, is sure to once experience a stop condition and so there develops no mis-operation and a tape can travel without a damage due to the transfer from one mode to another.
- T_2 is also a delay time (assured following the T_1) which prevents noise occurrence at Stop, FF and REW modes with muting signal, and makes the play output appear only after the tape speed has become steady. Since the capstan motor begins to function immediately with Play input, the muting is cancelled with a time delay of "T".

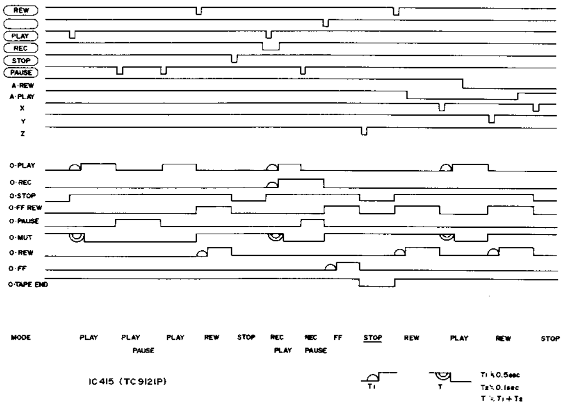


Figure 21–3

3. 3 Relation between Operation Mode and Mechanism

––– (Refer to Figure 22)

Referring to Fig. 22, we will next explain how the mechanical parts operate in each operation mode. In this figure, you will find the parts such as ① wind solenoid, ② capstan solenoid, ③ reel motor, ④ supply reel support, ⑤ wind roller, ⑥ take-up reel support, ⑦ capstan, ⑧ idler, ⑨ pinch roller, ⑩ record/playback head, ⑪ erase head and ⑫ sub-chassis.

A. At Stop mode:

All the drive parts are in stop and the wind roller ⑤ becomes in contact with the supply reel support ④ and take-up reel support ⑥ to brake them.

B. At Play mode:

As soon as the play key is pushed, the capstan (capstan motor) begins to rotate and 0.5 second after that, the capstan solenoid ② will move to activate the wind roller ⑤, idler ⑧, pinch roller ⑨ and subchassis ⑫ resulting in a playback condition shown in the figure This process holds true of the record/playback mode, also.

C. At FF mode:

When the FF key is pushed, 0.5 second thereafter the reel motor rotates in a normal direction so that the wind solenoid ① moves to make the wind roller ⑤ get in contact with the reel motor shaft: the result is that the reel motor shaft, with its rotation, will make the wind roller get in contact with the take-up reel support to rotate.

D. At REW mode:

When the REW key is pushed, 0.5 second thereafter the reel motor ③ rotates in a reverse direction so that the wind solenoid ① moves to make the wind roller ⑤ get in contact with the supply reel support to move.

E. AT Stop/Pause mode:

When Stop mode is changed to Pause mode, the capstan solenoid ② first start to move so that the set gets in once Play mode before reaching Pause mode: however, the capstan motor at that time is kept in a stop. 0.3 second thereafter, the wind solenoid ① begins to move and simultaneously the capstan solenoid ② is reset. With the wind solenoid in action, the record/playback head ⑩ and erase head ⑪ are stopped in contact with the tape's surface, because of the subchassis ⑫ not returning to a normal position for Stop mode.

F. At Play → Play/Pause mode:

If the pause key is pushed under Play mode, the wind solenoid ① begins to move and simultaneously the capstan solenoid ② is reset. With the wind solenoid in action, the record/playback head ⑩ and erase head ⑪ are stopped in contact with the tapes'surface, because of the subchassis ⑫ not returning to a normal position for Stop mode.

Meanwhile, if the pause key is pushed under Play/Pause mode, the capstan solenoid ② begins to move and simultaneously, the wind solenoid ① is reset to provide Play mode.

G. At APSS FWD mode:

When the APSS FWD key is pushed, the capstan solenoid ② begins to move 0.5 second thereafter so that the set gets in a condition the same as in Play mode: however, the capstan motor is kept in a stop. 0.3 second thereafter,the reel motor ③ starts to rotate in a normal direction, the wind solenoid ① gets in action and simultaneously the capstan solenoid ② is reset. The wind solenoid is to make the wind roller ⑤ be in contact with the reel motor shaft: the result is that the reel motor shaft makes, with its rotation, the wind roller be in contact with the take-up reel support to get in rotation. Besides, the record/playback head ⑩ and erase head ⑪ are stopped touching the tape's surface because of the subchassis not tending to return to a normal position for Stop mode.

H. At APSS REV mode:

When the APSS REV key is pushed, the capstan solenoid ② begins to move 0.5 second thereafter so that the set gets in a condition the same as in Play mode: however, the capstan motor is kept in a stop. 0.5 second thereafter, the reel motor ③ starts to rotate in a reverse direction, the wind solenoid ① gets in action and simultaneously the capstan solenoid ② is reset. The wind solenoid is to make the wind roller ⑤ be in contact with the reel motor shaft: the result is that the reel motor shaft makes, with its rotation, the wind roller be in contact with the supply reel support to get in rotation. Besides, the record/playback head ⑩ and erase head ⑪ are stopped touching the tape's surface because of the subchassis not tending to return to a normal position for Stop mode.

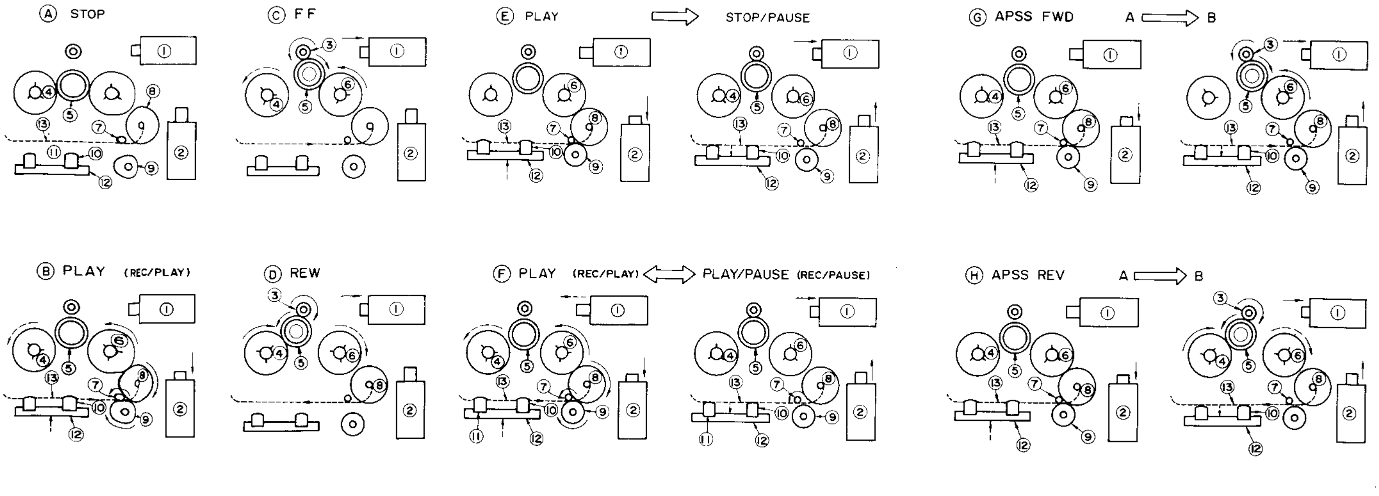


Figure 22–1

3. 4 CIRCUIT EXPLANATION

3. 4. 1 Space Timer Circuit (Refer to Figure 23–1)

Coming from the touch control circuit, when continuous pulse of low level is applied via the input terminal Ⓐ to the input terminal ⑧ of IC411 Ⓒ, this represents that at the input terminal ⑨ there also appears low-level pulse and so the output pulse becomes high level.

Going out of the output terminal ⑩ of IC411 Ⓒ, the pulse is shaped to as shown in Fig. (P-1) by the C415 and R426: at Record mode, the pulse of high level shown in Fig. (P-1) has been applied to the input terminal ⑤ of IC411 Ⓑ and so, there develops low-level pulse at the output terminal ④ during the time where the pulse shown in Fig. (P-1) is changed from high level to low level. During this time (about 5 seconds) of the pulse (P-1) becoming low level, there appears space signal and this signal is to turn on the Q401 so that there develops a current to light up the space indication LED and to activate the muting. It is then low-level pulse that is applied to the input terminal ⑫ of IC406 Ⓓ through a current charged by the C416 and R427: going out of the output terminal ② of IC407 Ⓐ, low-level pulse is supplied to the pause timer circuit so that the set gets in Record/Pause mode.

If there arises space signal under Pause mode, the pulse shown in Fig. (P-8) is applied to the input terminal ② of IC411 Ⓐ through a voltage charged by the C417 and R429: going out of the output terminal ③, low-level pulse shown in Fig. (P-10) is supplied to the pause timer circuit so that the set gets in Record/Play mode. It is in this way that the set goes to Record/Pause mode after the space timer cirucit has operated for about 5 seconds.

As shown in the above table, the output of the IC401 Ⓐ and Ⓑ becomes low level only when the inputs ① and ② are both at high level.

Under other modes than Record mode, it is, however, that since the input to the IC411 Ⓒ is kept at low level, the output of the IC411 Ⓐ and Ⓑ doesn't tend to become low level, which is different from the condition shown in Fig. 23–2. the result is that the space timer circuit can't operate at that time.

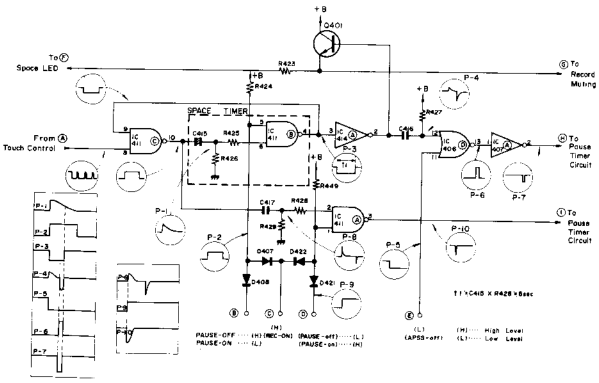

+B
Q401
To Ⓕ Space LED
R423
+B
R424
⑥ To Record Muting
P-4
SPACE TIMER
From Ⓐ Touch Control
IC 411 Ⓒ
C415
R425
R426
IC 411 Ⓑ
IC 414
C416
R427
IC 406
IC 407
⑤ To Pause Timer Circuit
P-3
P-6
P-7
R449
C417
R428
R429
IC 411
P-8
P-10
P-5
P-2
P-1
D407
D422
D408
D421
P-9
⑦ To Pause Timer Circuit
PAUSE-OFF (H) (REC-ON) (PAUSE-off) (L)
PAUSE-ON (L) (PAUSE-on) (H)
(APSS-off)
(H) High Level
(L) Low Level

Figure 23–1

Input①	Input②	Output
L	L	H
L	H	H
H	L	H
H	H	L

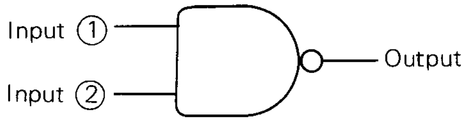

Input ①
Input ②
Output

Figure 23–2

3. 4. 2 Pause Timer Circuit (Refer to Figure 23–3)

The input signal (of low level) to the control LSI (IC415) during Pause mode is required to continue for more than 100 msec, as otherwise the set can't operate meeting the function of the chattering-preventive circuit. For this purpose, the pause timer circuit is provided to enable the pulse to continue for about 150 msec.

Coming from the touch control circuit, when the signal at the input terminal Ⓒ becomes low level, it is applied to the input terminal ⑧ of IC411 Ⓓ via the D411 and the signal appearing at the output terminal ⑪ goes, in turn, to high level.

Coming out of the output terminal ⑪ of IC411 Ⓓ, when the signal thus goes to high level, the input pulse to the IC414 becomes as shown in Fig. P-1 through a current charged by the C418 and R433 and the pulse appearing at the output terminal ④ becomes low level as shown in Fig. P-2. This pulse generating time is about 150 msec.

The same process also holds true of the case where the signal coming from the space timer circuit is applied to the input terminals Ⓐ and Ⓑ of the pause timer circuit.

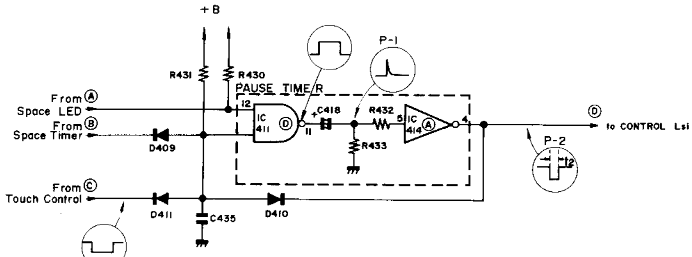

+B
P-1
R431
R430
PAUSE TIMER
From Ⓐ Space LED
From Ⓑ Space Timer
12
IC 411 Ⓓ
11
C418
R432
5
IC 414 Ⓐ
4
R433
D409
Ⓓ to CONTROL LSI
P-2
From Ⓒ Touch Control
D411
C435
D410

Figure 23–3

3. 4. 3 APSS FWD Delay Timer Circuit

(Refer to Figure 24–1)

The APSS FWD delay timer circuit is provided to delay the oncoming signal for a certain time when Stop, Play, FF or REW mode is changed to APSS mode so that the corresponding mechanisms become free from misoperation.

Coming from the touch control circuit, when a low-level signal is applied to the input terminal ① of IC 408, the signal appearing at the output terminal ⑨ goes to high level: the signal at the output terminal ② of IC413 Ⓐ is made to be at low level for a certain time T_3 through a current charged by the C411 and R414, so that the signal appearing at the output terminal ③ of IC410 Ⓐ is delayed by t_3 to become low level.

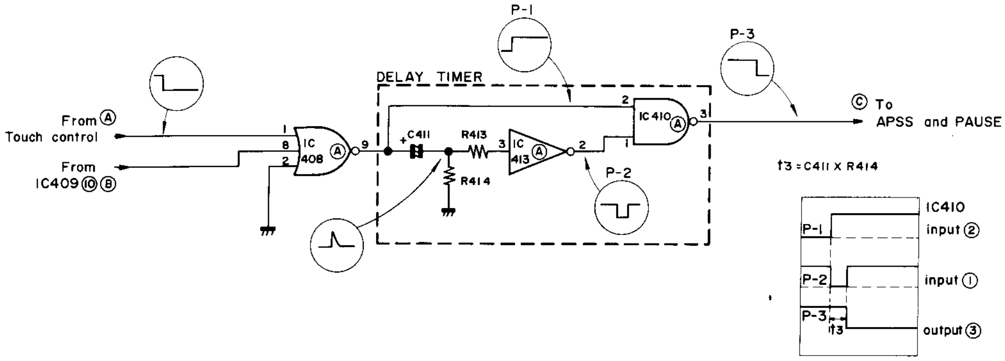

From Ⓐ
Touch control
From
IC409 ⑩ Ⓑ
1
8
2
IC 408 Ⓐ
9
DELAY TIMER
P-1
+C411
R413
3
IC 413 Ⓐ
2
R414
P-2
2
1
IC410 Ⓐ
3
P-3
Ⓒ To
APSS and PAUSE
t3 = C411 X R414
IC410
P-1
input ②
P-2
input ①
P-3
t3
output ③

Figure 24–1

3. 4. 4 Delay (APSS/Pause) Circuit (Refer to Figure 24–2)

Coming from the APSS FWD delay circuit, when a low-level signal is applied to the input terminal Ⓐ, the signal appearing at the output terminal ⑩ of IC413 Ⓓ goes to high level: the signal at the output terminal ⑫ of IC413 Ⓕ is made to become low level as shown in Fig. (P-4) for a certain time t_4 through a current charged by the C414 and R421. Meanwhile, the signal at the output terminal ⑩ of IC410 Ⓒ is delayed by T_4 to become low level and that at the output terminal ③ of IC409 Ⓐ is delayed by t_4 to go to high level. It is in this way that going out of the output terminals Ⓓ, Ⓔ, Ⓕ and Ⓖ, the signals are supplied to the respective mechanisms drive circuits to activate the APSS FWD circuit.

The same process applies also to APSS REV mode except for that the reel motor is to rotate in a direction reverse to that in APSS FWD mode. As for Pause mode too, the same operation holds true of it except for that there develops no reel nor motor drive signal.

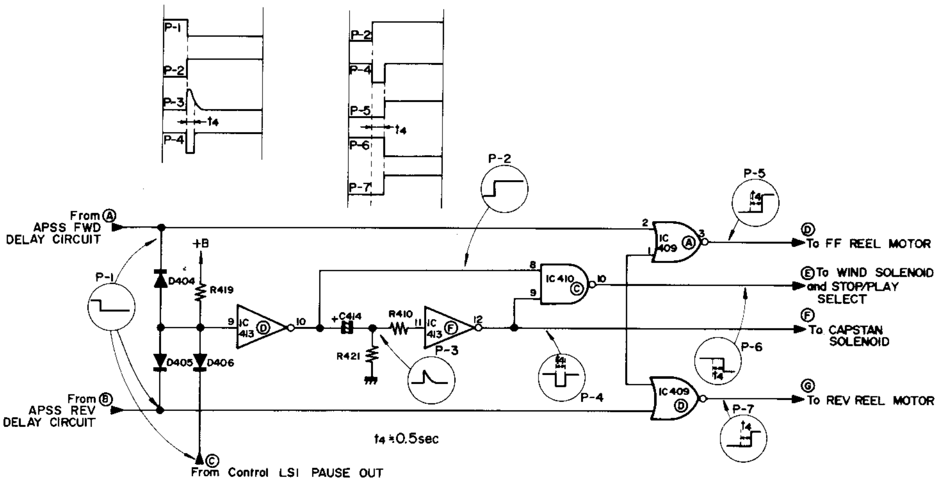

P-1
P-2
P-3
t4
P-4
P-2
P-4
P-5
t4
P-6
P-7
From Ⓐ
APSS FWD
DELAY CIRCUIT
P-1
+B
D404
R419
D405
D406
9
IC 413 Ⓓ
10
+C414
R410
R421
11
IC 413 Ⓕ
12
P-3
P-2
8
9
IC 410 Ⓒ
10
P-4
2
1
IC 409 Ⓐ
3
P-5
t4
IC 409 Ⓓ
P-6
t4
P-7
t4
Ⓓ To FF REEL MOTOR
Ⓔ To WIND SOLENOID and STOP/PLAY SELECT
Ⓕ To CAPSTAN SOLENOID
Ⓖ To REV REEL MOTOR
From Ⓑ
APSS REV
DELAY CIRCUIT
t4 ≒ 0.5sec
Ⓒ From Control LSI PAUSE OUT

Figure 24–2

3. 4. 5 Stop and Play Select Circuit (Refer to Figure 25–1)

When a tape travels and reaches its end, the auto stop circuit begins to function generating a stop control pulse: the signal of high level is applied to the input terminal Ⓓ to turn on the Q406, so that the high-level signal will enter the input terminal ② of IC406 Ⓐ. Then there appears a low-level signal at the output terminal ① of IC406 Ⓐ to be applied to the input terminal ④ of IC403 Ⓑ.

Next, there develops a high-level signal at the output terminal ⑥ of IC403 Ⓑ to be supplied, as a stop control signal, to the touch control circuit.

During when the cassette holder is open or no tape is put in the holder, it is so designed that a low-level signal is applied to the input terminal Ⓖ resulting in that the signal appearing at the IC403 Ⓑ is always kept at high level.

While the APSS is in action, if program-to-program space signal (of high level) is passed on to the input terminal Ⓑ, there appears a signal (of low level) at the output terminal ⑧ of IC403 Ⓒ to be applied to the input terminal ⑤ of IC406 Ⓑ. Assume that the set is then at Pause mode: a low-level signal is applied to the input terminal Ⓒ while a high-level signal, at the input terminal ⑥ of IC406 Ⓑ, so that there develops a low-level signal at the output terminal of IC406 Ⓑ. In addition, a low-level signal caused at Pause mode is supplied to the input terminal ⑨ of IC406 Ⓒ and there appears a high-level signal at the output terminal ⑩ to be applied, as a stop control signal, to the touch control circuit via the IC406 Ⓐ and IC403 Ⓑ.

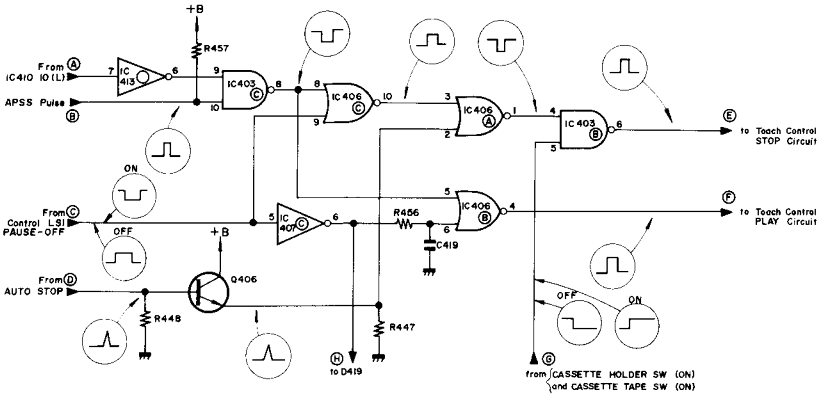

+B
R457
From Ⓐ IC410 10 (L)
APSS Pulse Ⓑ
IC 413
IC403 Ⓒ
IC406 Ⓒ
IC406 Ⓐ
IC403 Ⓑ
IC406 Ⓑ
IC 407
ON
OFF
From Ⓒ Control LSI PAUSE-OFF
From Ⓓ AUTO STOP
Q406
R448
R456
C419
R447
Ⓗ to D419
Ⓔ to Touch Control STOP Circuit
Ⓕ to Touch Control PLAY Circuit
Ⓖ from CASSETTE HOLDER SW (ON) and CASSETTE TAPE SW (ON)

Figure 25–1

3. 4. 6 REC/PB Solenoid and FF/RWD Solenoid Drive Circuit
(Refer to Figure 25–2)

In order to drive the solenoid according to each mode, it is needed at an initial stage at the driving to keep voltage supply at a fairly high level and to thereafter maintain it at a proper level not causing an abnormal temperature increase at the succeeding processes. It is at Play mode that coming from the logic control circuit, the Record/Playback solenoid control signal (of high level) is applied to the Q544 via the R658 so that this transistor is turned on. Then a current charged by the R640 and C601 runs in the Q534 so that this transistor is turned off for 0.5 sec. With the Q534 thus turned off, the Q533 and Q532 are both turned on so that a power of 30 V is impressed on the Record/Playback solenoid for 0.5 sec. via the D518 and Q545.

Next, the Q546 is turned on through the R657 and as a result, the Q545 is also turned on so that there arises, in turn, a power of 10 V through the Q542 and D526: this is caused 0.5 sec after a generation of the said power of 30 V.

The same process holds true of the FF/RWD solenoid drive circuit, also.

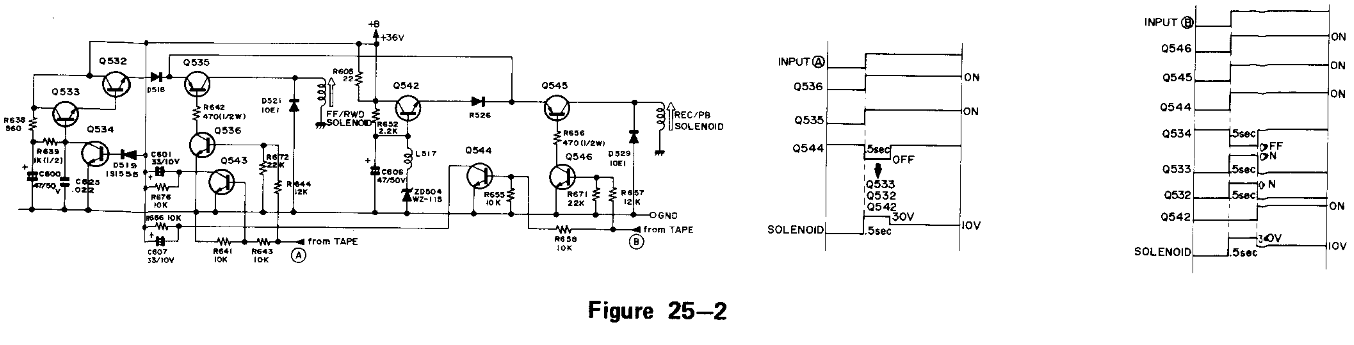

+B
+36V
Q532
Q533
Q534
Q535
Q536
Q542
Q543
Q544
Q545
Q546
D518
D521 10E1
R642 470(1/2W)
R605 22
FF/RWD SOLENOID
R652 2.2K
R526
R656 470(1/2W)
D529 10E1
REC/PB SOLENOID
L517
C606 47/50V
ZD504 WZ-115
R655 10K
R671 22K
R657 12K
GND
from TAPE Ⓑ
R658 10K
R638 560
R639 1K(1/2W)
C600 47/50V
C625 .022
C601 33/10V
D519 1S1555
R676 10K
R672 22K
R644 12K
R686 10K
C607 33/10V
R641 10K
R643 10K
from TAPE Ⓐ
INPUT Ⓐ
ON
.5sec
OFF
SOLENOID
30V
10V
INPUT Ⓑ
OFF
ON

Figure 25–2

3. 4. 7 **Full Auto Stop Circuit** (Refer to Figure 26–1)

- Under Stop and/or Pause mode, coming from the tape deck logic control circuit, when a low-level signal is applied to the Q547, this transistor is turned off while the Q521 is turned on through a base current coming from the R618. Under this condition, the base voltage of R522 becomes lower than its emitter voltage and so that Q522 is kept turned off.
- When a tape starts to travel, the magnet at the tape counter is allowed to rotate to give the Hall IC a magnetic field, generating a continuous pulse. This continuous pulse is rectified by the D517 and C594 to lower the base potential of Q522 through the D515, so that this transistor Q522 is turned off.
- When a tape reaches its end, the counter stops and the magnet also stops to rotate so that there develops no pulse at the Hall IC: the result is that the base potential of Q522 is increased through the R622 so that this transistor is turned on.

  This circuit (Q522 and Q523) is an astable multivibrator circuit by which pulse signals are passed on through the R662 to the stop/play select circuit inside the logic control circuit.

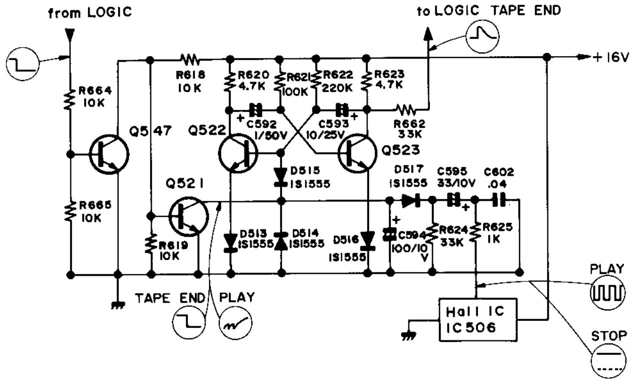

from LOGIC
to LOGIC TAPE END
+16V
R664 10K
R665 10K
Q547
Q521
R618 10K
R619 10K
R620 4.7K
R621 100K
R622 220K
R623 4.7K
C592 1/50V
C593 10/25V
Q522
Q523
R662 33K
D515 1S1555
D517 1S1555
C595 33/10V
C602 .04
D513 1S1555
D514 1S1555
D516 1S1555
C594 100/10V
R624 33K
R625 1K
TAPE END
PLAY
Hall IC IC506
PLAY
STOP

Figure 26–1

3. 4. 8 **REC Solenoid Control Circuit** (Refer to Figure 26–2)

Coming from the logic control circuit under Record mode, when a low-level signal is applied to the REC solenoid control circuit the Q540 is turned on while the Q534, off: simultaneously, the Q541 becomes free, through the D523, from an influence by the Q538 and the Q541 is turned on for 0.3 sec through a current charged by the C605 and R651. In addition, with the Q538 turned off, the Q537 is turned on so that a power of 8 V is created through the D522 to be applied to the REC solenoid.

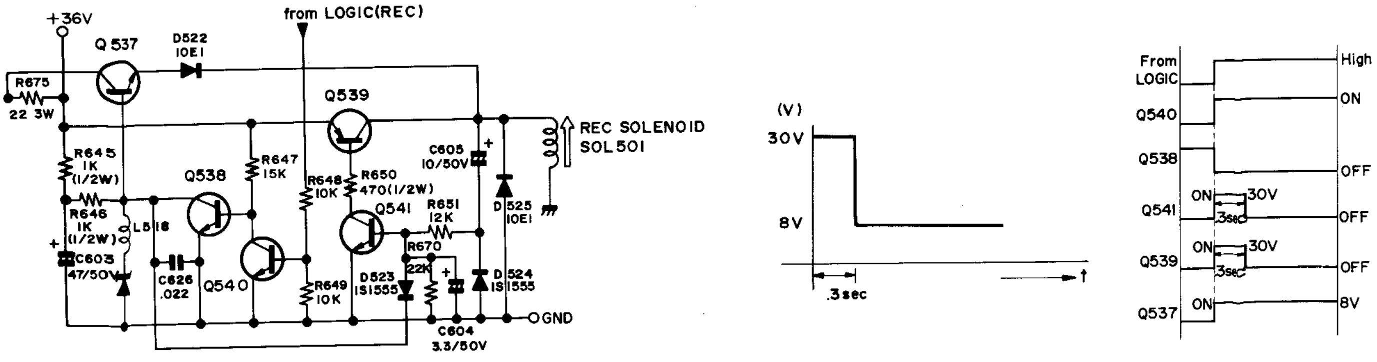

+36V
Q 537
D522 10E1
from LOGIC(REC)
R675 22 3W
Q539
R645 1K (1/2W)
R646 1K (1/2W)
C603 47/50V
L518
C626 .022
Q538
R647 15K
Q540
R648 10K
R650 470(1/2W)
C605 10/50V
Q541
R651 12K
R670 22K
D523 1S1555
R649 10K
D525 10E1
D524 1S1555
C604 3.3/50V
GND
REC SOLENOID SOL501
(V)
30V
8V
.3sec
t
From LOGIC
Q540
Q538
Q541
Q539
Q537
High
ON
OFF
ON
30V
.3sec
OFF
ON
30V
.3sec
OFF
ON
8V

Figure 26–2

3. 4. 9 Reel Motor Control Circuit (Refer to Figure 27–1)

During when the set is at REW and/or APSS REW mode, the Q528 and Q529 are both turned on through the R634: simultaneously, the Q526 is turned on through the R631, so that there arises a drive current to run in the Q526, L521, motor, L520 and Q529 in this order, resulting a reverse rotation of the reel motor.

In the case of FF and/or APSS FWD mode, a drive current runs in the Q527, L520, motor, L521 and Q525 in this order resulting in a normal rotation of the reel motor.

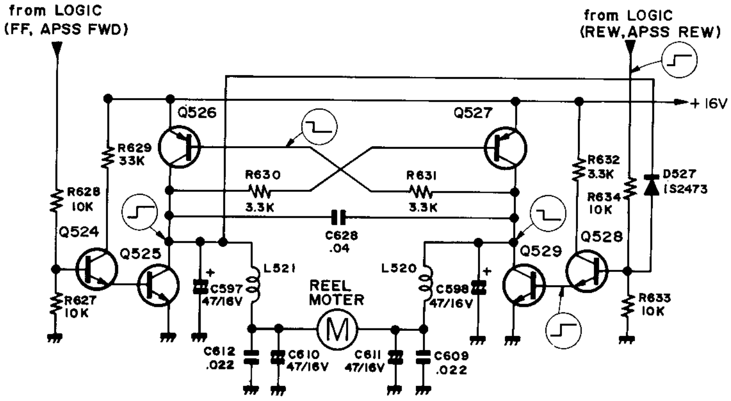

from LOGIC
(FF, APSS FWD)
from LOGIC
(REW, APSS REW)
+ 16V
Q526
Q527
R629
33K
R628
10K
Q524
Q525
R627
10K
R630
3.3K
R631
3.3K
C628
.04
R632
3.3K
R634
10K
D527
1S2473
Q528
Q529
R633
10K
L521
L520
C597
47/16V
C598
47/16V
REEL
MOTER
M
C612
.022
C610
47/16V
C611
47/16V
C609
.022

Figure 27–1

3. 4. 10 Capstan Motor Drive Circuit (Refer to Figure 27–2)

The capstan motor is so designed as to rotate when the set get in Play, Play/Pause, REC/Play and/or REC/ Pause mode.

Coming from the tape deck logic control circuit, when a high-level signal is applied to this capstan motor drive circuit, the Q530 and Q531 are both turned on so that there arises a drive current to run in the L522, motor and Q531 in this order.

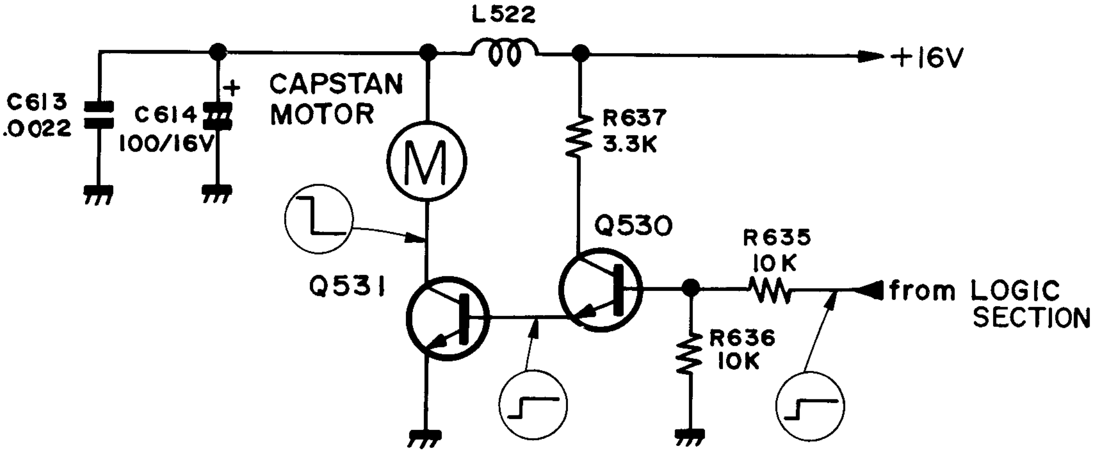

L522
+16V
C613
.0022
C614
100/16V
CAPSTAN
MOTOR
M
R637
3.3K
Q530
Q531
R635
10K
R636
10K
from LOGIC
SECTION

Figure 27–2

4. TAPE DECK REC/P.B. AMPLIFIER

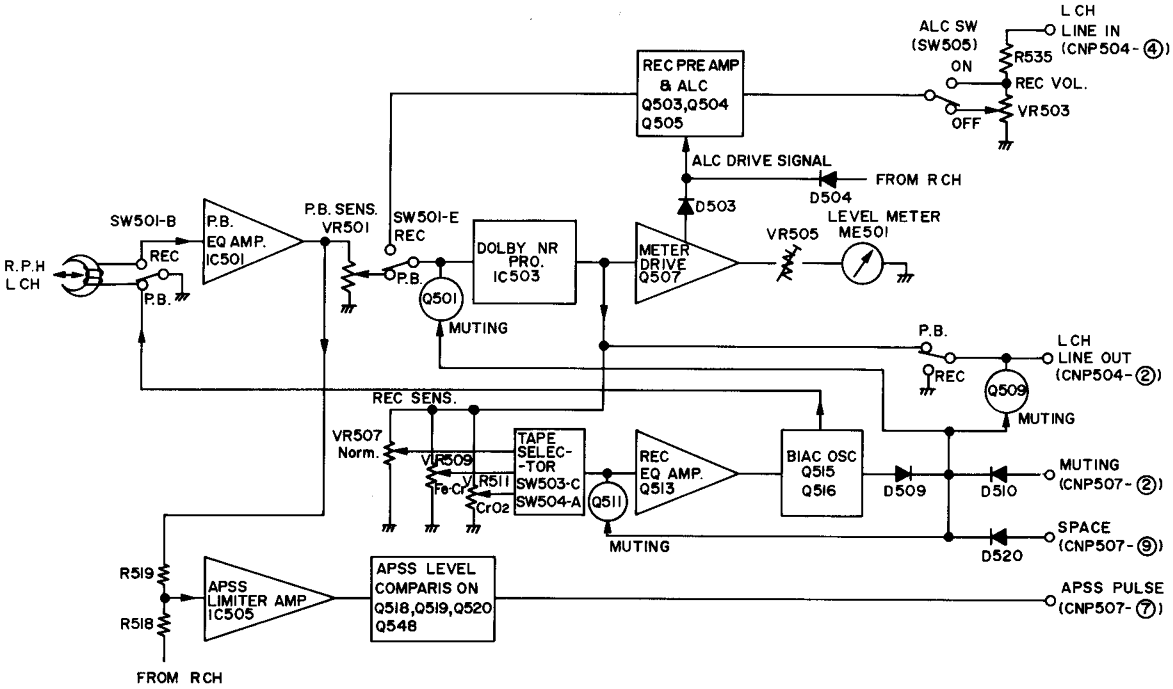

L CH
LINE IN
(CNP504-④)
ALC SW
(SW505)
ON
OFF
R535
REC VOL.
VR503
REC PRE AMP
& ALC
Q503,Q504
Q505
ALC DRIVE SIGNAL
FROM RCH
D504
D503
LEVEL METER
VR505
ME501
SW501-B
P.B.
EQ AMP.
IC501
REC
R.P.H
L CH
P.B.
P.B. SENS.
VR501
SW501-E
REC
DOLBY NR
PRO.
IC503
P.B.
Q501
MUTING
METER
DRIVE
Q507
P.B.
REC
L CH
LINE OUT
(CNP504-②)
Q509
MUTING
REC SENS.
VR507
Norm.
VR509
Fe-Cr
VR511
CrO2
TAPE
SELEC-
-TOR
SW503-C
SW504-A
Q511
REC
EQ AMP.
Q513
BIAC OSC
Q515
Q516
D509
D510
MUTING
(CNP507-②)
SPACE
D520
(CNP507-⑨)
MUTING
R519
R518
APSS
LIMITER AMP
IC505
APSS LEVEL
COMPARIS ON
Q518,Q519,Q520
Q548
APSS PULSE
(CNP507-⑦)
FROM RCH

Figure 28—1

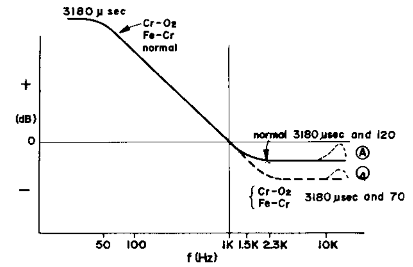
4.1 SYNOPSIS (Refer to Figure 28)

- Coming out of the Q507 (meter drive), a part of the signal becomes ALC drive signal during Record mode to be applied to the variable attenuator composed of Q504: this attendator is driven into conduction when the ALC is turned on.
- Being amplified by the playback equalizer amplifier, both-channel signals are integrated into one signal by the R519 and R518, then to be, after being amplified by the IC505, applied to the APSS level comparison circuit which is to detect whether there has been a presence of a program itself or a program-to-program space: if the program-to-program space is detected, there develops a pulse to be transferred to the tape deck logic control circuit.
- The muting circuit is provided to control the Q501, Q509 and Q511 to create a muting effect for such purposes as that: (1) possible noises will be cut off during Stop, FF, REW, Stop and/or Pause mode, (2) no playback will be caused during APSS mode and (3) no sound will come out for a while under Play mode until the tape traveling speed has become steady. This circuit is also useful when preparing a 5 seconds space between programs of a tape which won't be recorded even under Record mode.
- The tape selector switch is to change over bias current and erase current, or to select record/playback equalizer characteristic and record sensitivity according to a normal, Fe-Cr or CrO2 tape to be used.

4. 2 CIRCUIT EXPLANATION

4. 2. 1 **Playback Equalizer Amplifier** (Refer to Figures 29—1, 2)

- The playback equalizer amplifier is to not only amplify a feeble amount of signal coming from the playback head up to a specified-level but also to make flat its frequency characteristic.
- In any of common tape deck, its time constant for a low-frequency range is fixed to 3180 μsec and therefore, it is only for the high-frequency range that the circuit is required to change the time constant according to the types of tapes to be used.
- The C513, R517 and R515 are to assure a characteristic peculiar to the time constants 3180 μsec and 120 μsec: another characteristic by the time constants 3180 μsec and 70 μsec is available when the R515 is shorted by the SW503A. Fig. 29—1 Ⓐ represents a characteristic that is obtained by making inductance of the playback head and capacitance of the C503 resonate in parallel with each other.



Standard Play back Frequency Characteristec

Figure 29—1—A

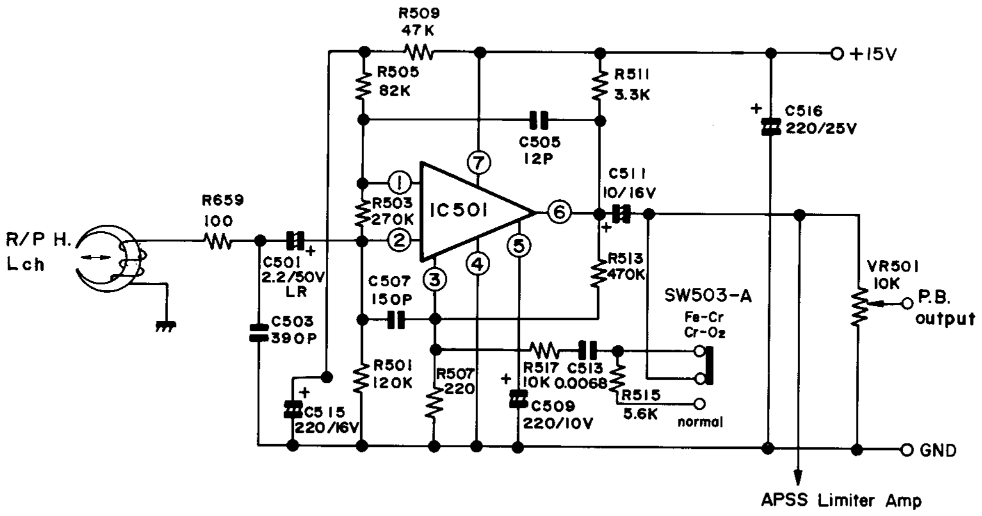

R509
47K
R505
82K
R511
3.3K
+15V
C516
220/25V
C505
12P
C511
10/16V
R659
100
R/P H.
Lch
⑦
①
R503
270K
IC501
⑥
②
⑤
④
③
C501
2.2/50V
LR
C507
150P
R513
470K
SW503-A
Fe-Cr
Cr-O2
VR501
10K
P.B.
output
C503
390P
R501
120K
R507
220
R517
10K
C513
0.0068
R515
5.6K
normal
C515
220/16V
C509
220/10V
GND
APSS Limiter Amp

Figure 29—1—B

4. 2. 2 **ALC Circuit** (Refer to Figure 29—3)

While the ALC circuit is at "ON" position, if the incoming signal level increases beyond the limit value, the output signal level is automatically lowered so as to become always constant: the setting level is designated at a value about 3 dB lower than the rated one (0 VU). Thanks to this function, it is permitted for you to keep always a proper recording level like in the case of manual recording, even by using a music source which is very liable to vary in its level.

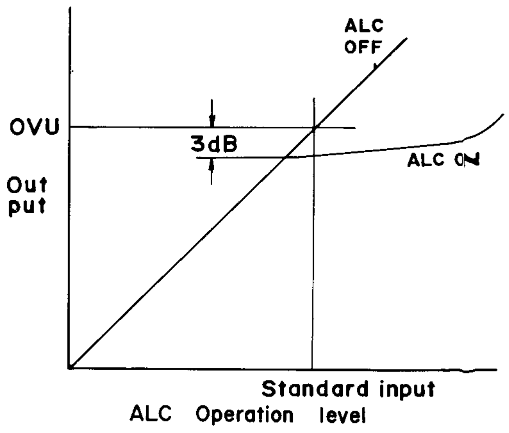


Figure 29—2

4. 2. 3 Dolby System

1. **IC Configuration** (Refer to Figure 31–1)

- Between the amplifiers A and B is connected the low-pass filter of 15 kHz. This low-pass filter serves to prevent the circuits from mis-operating possibly due to pilot signal coming from the FM tuner or record bias leaking from the tape deck amplifier. The signal coming out of the amplifier B is coupled to the record/playback switch and this signal is also applied to the input terminal α of the amplifier E. The amplifier C is a variable gain type and its frequency characteristic is shown in Fig. 30, which is like that assured by the high-pass filter.

  The amplifier G is to rectify a part of the signal coming out of the amplifier D and create a DC signal from this signal, regulating the variable attenuator of the amplifier C.
- The capacitors and resistors coupled with the terminals ⑬ , ⑭ and ⑮ are to determine attack time and recovery time of the variable attenuator.

2. **Basic Behavior**

Tape hissing noise is the most important problem to be solved for better enjoyment of listening and to eliminate this problem, the Dolby NR system is developed enabling that a medium/high-frequency component of the said hissing noise is 10 dB boosted in recording and it, in turn, will be levelled down by the same amount in reproduction so that the resultant overall frequency characteristic be made flat. The boost circuit, called a compressor, is to adjust the boost amount according to the intensity of input signal while the level-down circuit, called an expander, to decide the corresponding level-down amount.

3. **Signals Flow** (Refer to Figure 31–2)

When the Dolby NR switch (SW-506) is set at "ON" position and the SW501-G and -H, at "REC" position, incoming signal is applied to the input terminal ⑤ of IC503, then to be subjected to frequency compensation (by the high-pass filter) and there appears a signal at the output terminal ⑦ to be transferred to the record equalizer amplifier.

4. **Dolby NR Level**

The signals for both Record and Playback modes must be the same in their level in order for the Dolby NR system to provide a normal operation: for this purpose, the potential level at the terminal ③ of IC503 is designated at 580 mV (the allowable errors ±1 dB). To ensure this value at any mode, the semi-variable resistor (R505) is provided to adjust playback or record sensitivity: actually, the R505 is to be adjusted in such a way that the level meter will indicate 0VU when the voltage at the terminal ③ is set at 580 mV.

5. **Included Parts and their Roles**

- Input/output coupling: C523, C547, C549
- Power-supply decoupling: R553, C526
- Coupling of the amplifiers D and G: C529
- DC cutting: C535, C537
- The R559 is a resistor which is provided to keep always constant the IC internal phase characteristic even with any amount of load applied to the playback output terminal.

Dolby NR System (Refer to Figure 32)

- The Dolby NR system is so designed as to reduce so called tape hissing noise: this noise refers to both a tape-proper including noise and a bias noise which is additionally generated at the time of recording.
- As to fortissimo part of the recorded signal (shown in Fig. 32–3–A), its hiss noise level and desired signal level are far apart each other and so the resultant noise is not so strong as to be noticeable for the listener (this means a good S/N ratio assured). But for the pianissimo part, both levels are fairly close to each other (this means an inferior S/N ratio resulted) and the resultant noise in playback becomes noticeable.

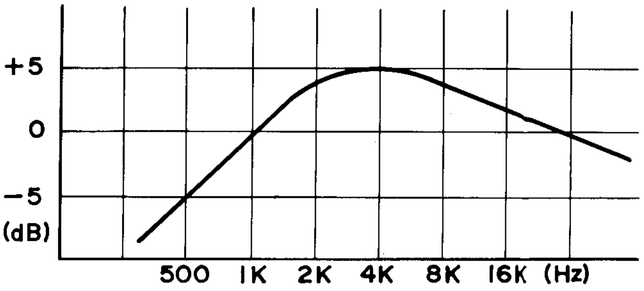


Figure 30–1

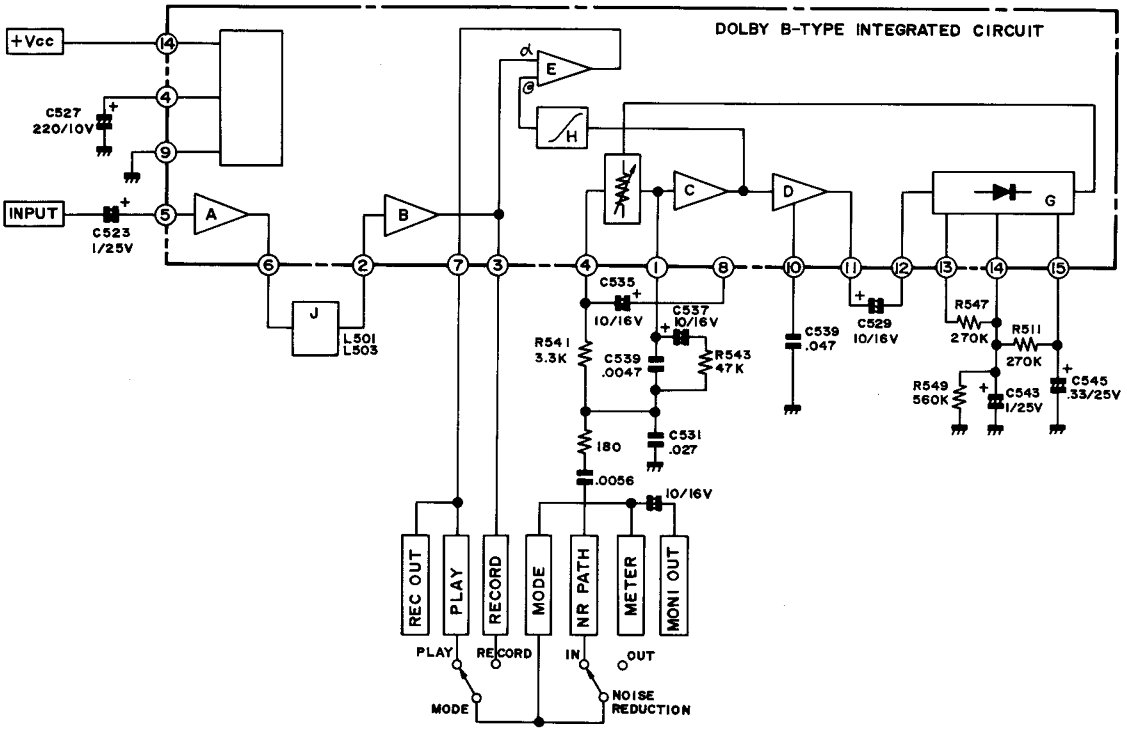

DOLBY B-TYPE INTEGRATED CIRCUIT
+Vcc
C527
220/10V
INPUT
C523
1/25V
A
B
E
α
β
H
C
D
G
J
L501
L503
C535
10/16V
C537
10/16V
R541
3.3K
C539
.0047
R543
47K
C539
.047
C529
10/16V
R547
270K
R511
270K
R549
560K
C543
1/25V
C545
.33/25V
180
C531
.027
.0056
10/16V
REC OUT
PLAY
RECORD
MODE
NR PATH
METER
MONI OUT
PLAY
RECORD
IN
OUT
MODE
NOISE REDUCTION

Figure 31–1

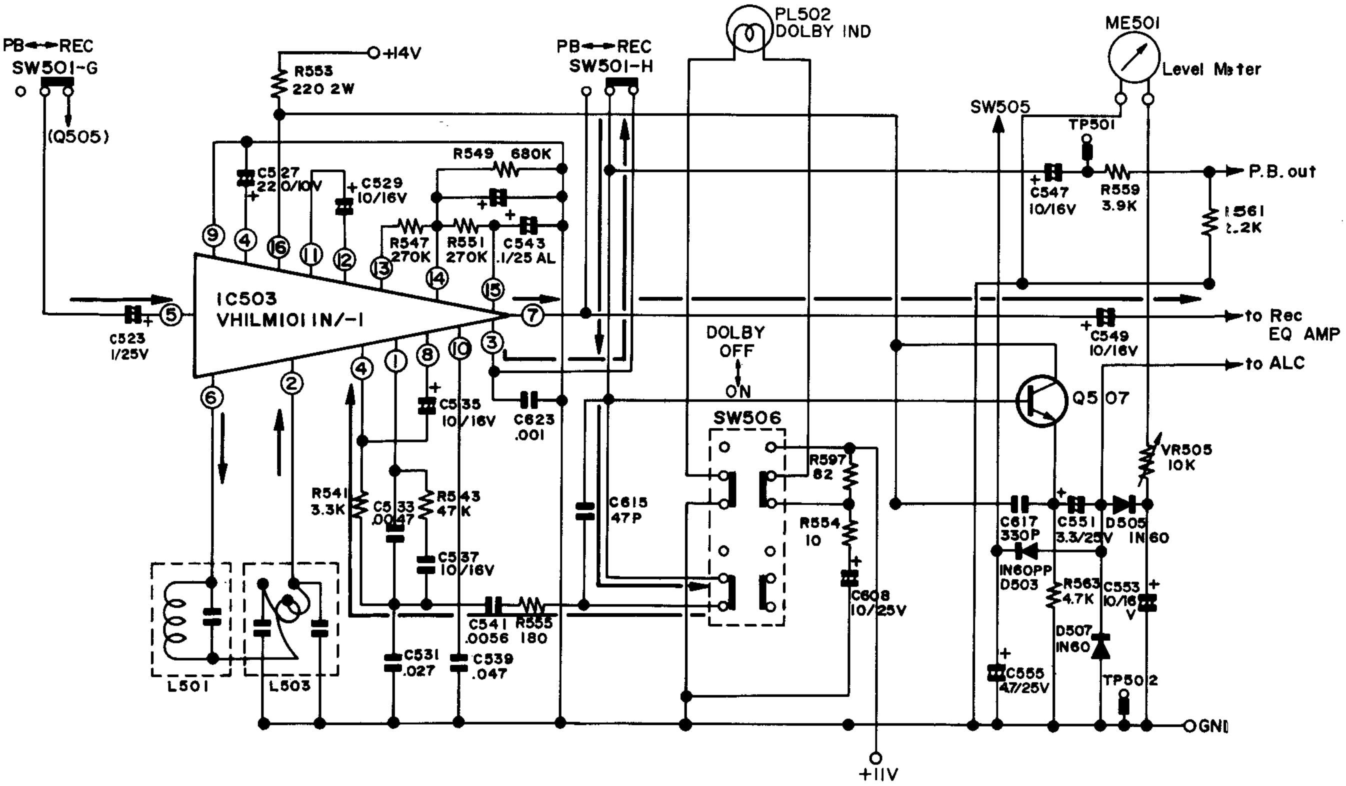

PB↔REC
SW501-G
(Q505)
R553
220 2W
+14V
C527
220/10V
C529
10/16V
R549 680K
R547
270K
R551
270K
C543
.1/25 AL
IC503
VHILM1011N/-1
C523
1/25V
C535
10/16V
C623
.001
R541
3.3K
C533
.0047
R543
47K
C537
10/16V
C541
.0056
R555
180
C531
.027
C539
.047
L501
L503
PB↔REC
SW501-H
PL502
DOLBY IND
DOLBY
OFF
ON
SW506
C615
47P
R597
82
R554
10
C608
10/25V
+11V
SW505
ME501
Level Meter
TP501
C547
10/16V
R559
3.9K
P.B. out
R561
2.2K
to Rec
EQ AMP
C549
10/16V
to ALC
Q507
VR505
10K
C617
330P
C551
3.3/25V
D505
IN60
IN60PP
D503
R563
4.7K
C553
10/16V
D507
IN60
C555
47/25V
TP502
GND

Figure 31–2

- To solve this problem, it is so designed that only the pianissimo part is boosted in its level as shown in Fig. 32—3—B,. when recorded: the result is that there will be more difference between the noise level (maintained as before) and the desired signal level.
- In playback, the pianissimo part is levelled down at the same amount as in recording, as shown in Fig. 32—3—C, so that the noise level is also lowered giving rise to an increase of S/N ratio.
- As shown in Fig. 32—4—A, the Dolby NR system is to put its effect for only the range of more than 500 Hz but not for all the range of other frequencies.
- It is, in addition, noted that the compressor and expander are so designed as to adjust their output level variously according to differences of the input level and frequencies (of more than 500 Hz).
- In the case of record mode (Refer to Figure 32—1)
  (1) Being amplified by the amplifier 1, the signal is divided into the two: one is applied to the amplifir 2 and another to the high-pass filter via the REC/P.B switch.
  (2) The high-pass filter is to allow the signal of more than 500 Hz to be passed therein to be transferred to the succeeding circuits.
  (3) Passing through the high-pass filter, the signal is applied to the attenuator and then to the FET gate: this attenuator is controlled by the signal which has been amplified and rectified by the amplifier 3 and therefore, there develops more amount of attenuation as the input signal (voltage control signal) is increased in its intensity.
  (4) Combination of the filter, attenuator, amplifier 3 and rectifier circuit is called a Dolby-side chain (shown in Fig. 32—4—C).
  (5) The output signal of the Dolby side chain is applied to the input circuit of the amplifier 2 where it is combined with that of the amplifier 1.
  (6) Input to and output of the amplifier 2 are made reverse to each other in their phase: this is achieved by so-called Dolby summing circuit.
- In the case of playback mode (Refer to Figure 32—2) There develops the signal having a characteristic reverse to that in the case of record mode.

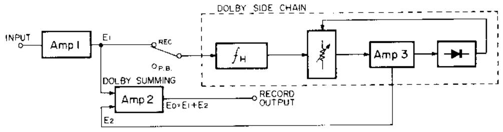


Figure 32—1

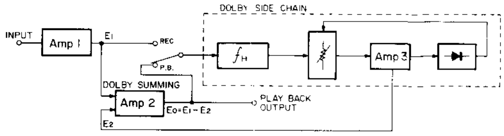
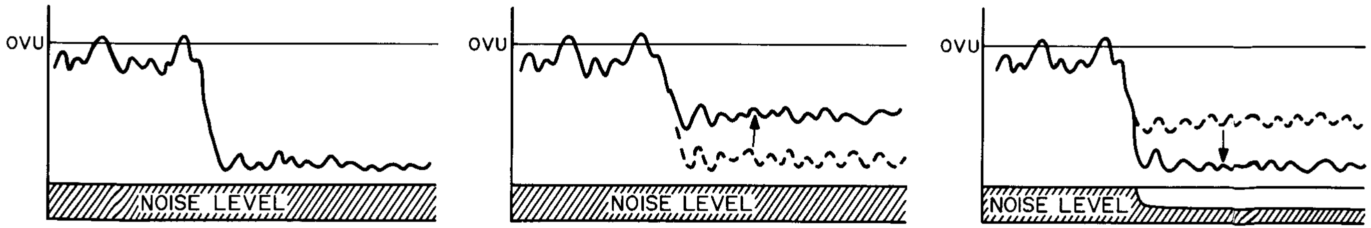


Figure 32—2

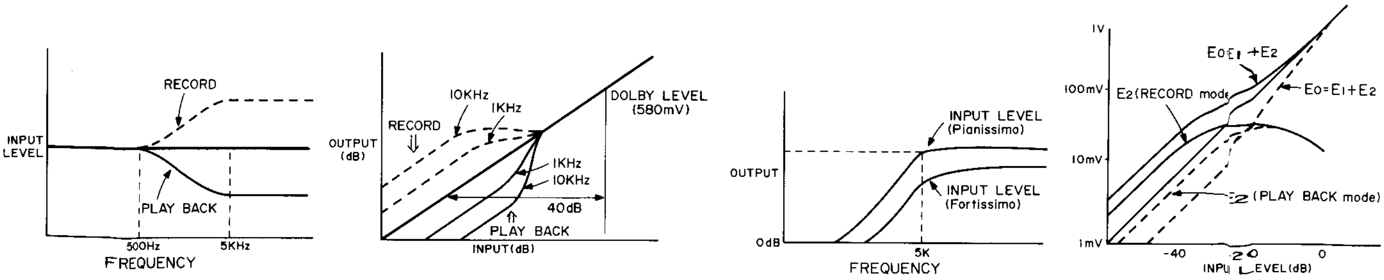


INPUT
(A)

RECORD
(B)

PLAY BACK
(C)

Figure 32—3



(A) (B) (C) (D)

Figure 32—4

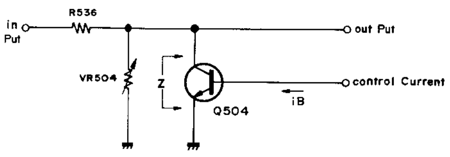
4. 2. 4 Record Preamplifier (Refer to Figure 33)

- It is so designed that the signal coming from each source (controlled by the mode selector) is once levelled down by the attenuator before reaching this record preamplifier: this is for the purpose to improve various factor of such as signal level, load resistance and distortion under ALC mode. Only after that, the signal is applied to the record preamplifier having a gain of about 17 dB where it is amplified up to the original intensity then to be transferred to the next-stage Dolby processor circuit. When the ALC is kept at "OFF" position, the signal which has been attenuated by the R536 and VR504 is subjected to only the amplification by the Q504.
- The variable attenuator is constructed as shown in Fig. 33–1.

  To the attenuator formed by the R536 and VR504 are coupled the collector and emitter of Q504: when the base current is increased or decreaced, the collector-to-emitter impedance Z varies accordingly, resulting in a variation of the total amount of attenuation.
- Speaking of attenuation characteristic of this circuit, the attenuation amount increases to some extent as the base current (IB) is increased gradually, but it stops to increase and remains at the same level if it exceeds such a limited point: this condition means that the impedance (Z) is well saturated.
- Coming from the meter drive circuit, DC signals (for both channels) are applied to the D503 and D504 where they are forced to become a composite signal. This DC signal is then DC-amplified by the Q503 to drive the Q504 in conduction.

  The R524 serves to limit the amount of a current running in the Q504, and the R525 is, together with the R526 (for R-channel), to make the base current of Q504 be equally assured for both channels.

  The Q504 is of a package including two transistors and it is so designed, in its characteristic, as to provide the same ALC effect for both channels. The C518 is to decide attack time and recovery time of this circuit: the attack time and recovery time are designated respectively at 0.3 sec and 30 sec.


R536
in
Put
out Put
VR504
Z
Q504
iB
control Current

Variable Attenuator

Figure 33–1

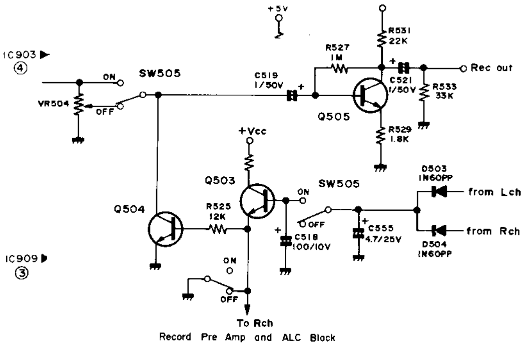
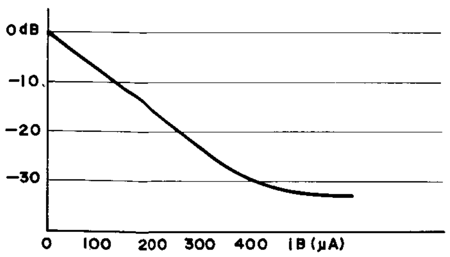
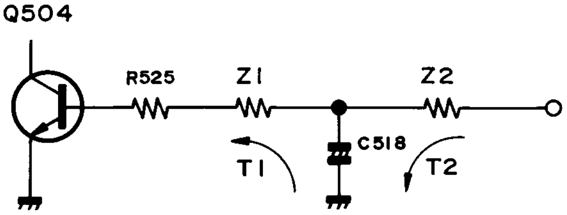

+5V
IC903 ▶
④
ON
SW505
VR504
OFF
C519
1/50V
R527
1M
R531
22K
C521
1/50V
Rec out
R533
33K
Q505
R529
1.8K
+Vcc
Q503
Q504
R525
12K
ON
SW505
OFF
C518
100/10V
C555
4.7/25V
D503
IN60PP
from Lch
from Rch
D504
IN60PP
IC909 ▶
③
ON
OFF
To Rch
Record Pre Amp and ALC Block

Figure 33–2



Attenuation Characteristic

Figure 33–3


Q504
R525
Z1
Z2
C518
T1
T2

Z1 : R525 X Q503 (AFE)
Z2 : Impedance (Rectifier)
T1 : Recovery Time
T2 : Attack Time

Figure 33–4

4.2.5 **Record Equalizer Circuit** (Refer to Figure 34)

The record equalizer circuit is provided to give the recorded signal with an appropriate frequency characteristic and it is equipped with the independent control switches and medium/high-frequency compensator circuit meeting the characteristics of three kinds of tapes to be used: the SW-503 and SW504 are to be changed over according to these tapes.

- In Figure 34–1:
  - A; Standard playback frequency characteristic.
  - B; Frequency characteristic obtained when the sound without a magnetic head loss is played back.
  - C; All loss factors including the magnetic head loss
  - D; Synthetic frequency characteristic of C and A
  - E; Bandwidth required for the record equalizer circuit
- In Figure 34–2:

  The frequency characteristic shown in this figure is to compensate for an insufficiency in the required bandwidth shown in Fig. 34–1–E.
  - A; Boosted portion in the low-frequency range
  - B; Medium-frequency range correction
  - C; High-frequency range correction
  - D; A cross-over section between the correction characteristics C and B and this can be changed by adjusting the head or tape.
  - E; Boost amount adjustable range at high-frequency peaking
  - F; High-frequency peaking
- In Figure 34–3:

VR-507, –509 and –511;	For adjusting record sensitivity
R565, R571, R675 and C619;	For low-frequency range characteristic (A)
R576 and C561;	For medium-frequency range characteristic (B)
L505, R581 and C563;	For high-frequency range peaking characteristic (D)
R576;	For adjusting the section "D" of Fig. C–18
R581;	For adjusting the section "E" of Fig. C–18
L505 and C563;	For determining peaking frequency

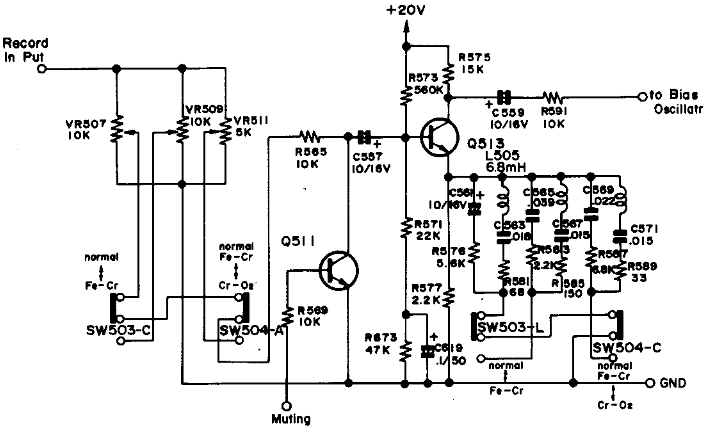

+20V
Record In Put
VR507 10K
VR509 10K
VR511 5K
R575 15K
R573 560K
to Bias Oscillatr
C559 10/16V
R591 10K
R565 10K
C557 10/16V
Q513
L505 6.8mH
C561 10/16V
C565 .039
C569 .022
C563 .018
C567 .015
C571 .015
R571 22K
R576 5.6K
R583 2.2K
R587 6.8K
R589 33
R581 68
R585 150
R577 2.2K
Q511
normal
Fe-Cr
Cr-O2
R569 10K
SW503-C
SW504-A
R673 47K
C619 .1/50
SW503-L
SW504-C
GND
Muting

Fig. C-16

Figure 34–1

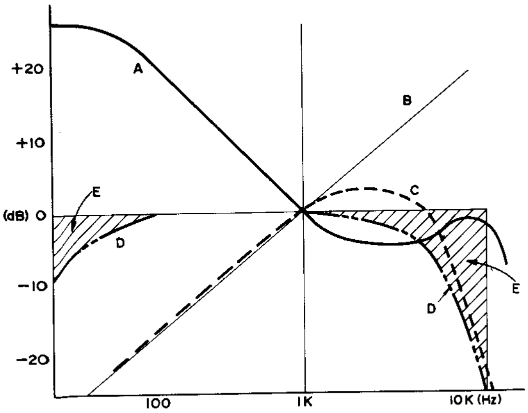


Figure 34–2

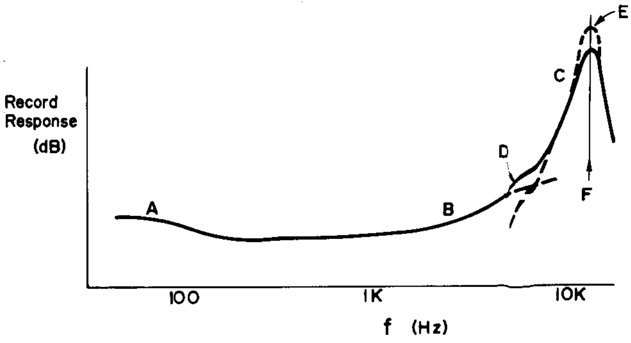


Figure 34–3

4. 2. 6 **Bias Oscillator Circuit** (Refer to Figures 35–1 and –2)

It is needed for the amount of bias current to be changed according to the types of tapes (normal, Fe-Cr or CrO2) to be used: in addition to this, a proper amount of bias current can vary depending upon quality dispersions of the bias oscillator circuit, magnetic head, and L-ch. and R-ch. output circuits. When the SW501-C is set at "REC" position, the bias oscillator circuit begins to function: the R593 and R594 are to provide DC bias to the base while the R595 and R596, to produce a current negative feed back assuring a stable operation of the entire circuitry. The C573 and C572 form a positive feedback circuit to cause oscillation: the oscillation frequency is determined by the C577 and L511 which are to resonate with each other. The C576 is to apply a proper negative feedback amount to the oscillator circuit eliminating a possible distortion of the oscillator's output signal. Passing through the VR513, bias component is applied first to the primary of L513 and then to its secondary where it is boosted up to about 30 V. Going out of the secondary of L513, the bias current is applied to the magnetic head through a loop composed of RPH, R659 and C579.

Record signal runs, via the constant current drive resistor R571, in the secondary of L513 then to drive the magnetic head into conduction. It is in this way that a variation of the bias current if caused is limited to the allowable value even when there arises a frequency shift of about 6 kHz through the RIF switch.

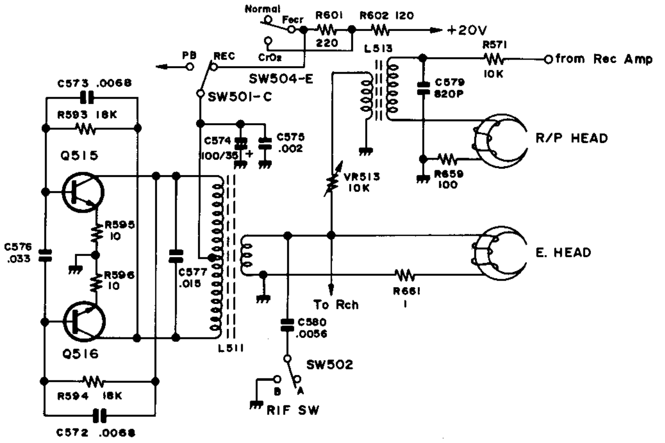

Normal
Fecr
CrO2
R601
220
R602 120
+20V
PB
REC
SW504-E
SW501-C
L513
R571
10K
from Rec Amp
C579
820P
R/P HEAD
C573 .0068
R593 18K
Q515
C574
100/35
C575
.002
VR513
10K
R659
100
R595
10
C576
.033
R596
10
C577
.015
E. HEAD
R661
1
To Rch
Q516
L511
C580
.0056
SW502
B
A
RIF SW
R594 18K
C572 .0068

Figure 35–1

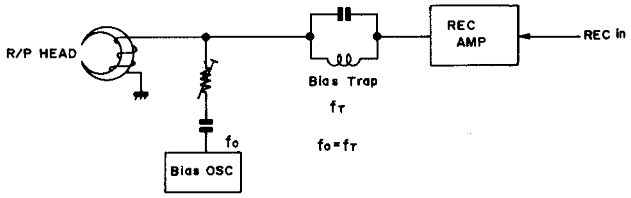

R/P HEAD
REC AMP
REC In
Bias Trap
fT
fo
fo=fT
Bias OSC

Fig. C-20

Figure 35–2

4. 2. 7 **Muting Circuit** (Refer to Figures 35–3 and –4)

- Space circuit

The muting circuit is a full-electronically controlled circuit; when the Q501 and Q509 are turned on, there develops about 60 dB of the attenuation per stage (more than 100 dB in total).

The muting circuit is so designed as to function always when the set gets in either of Stop, Stop/Pause, FF, REW or APSS REV/FWD mode. Besides, under Play mode, this circuit also works for a while (0.6 sec) until the tape traveling speed gets steady. These muting controls depend upon the functions of the tape deck logic control circuit.

When the mode selector is changed from "Play" to "Record" position, the three terminals are all shorted in an instant so that there develops a base current running through the D509 to provide a muting effect. In changing from Record mode to Play mode, the muting is effected based on the use of a voltage of the C574 discharging through the R600.

When preparing a program-to-program space of a tape under Record mode, this muting circuit works in such a way that: coming out of the logic control circuit a base current runs in the R654 and D520 to turn on the Q501 and Q519, the result is that the said space becomes a non-recorded part.

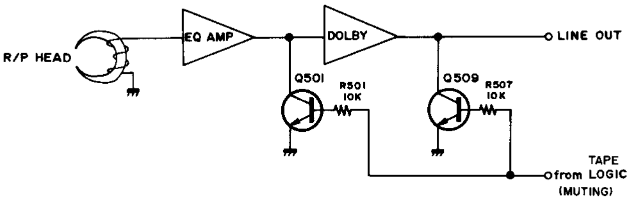

R/P HEAD
EQ AMP
DOLBY
LINE OUT
Q501
R501
10K
Q509
R507
10K
TAPE
from LOGIC
(MUTING)

Figure 35–3

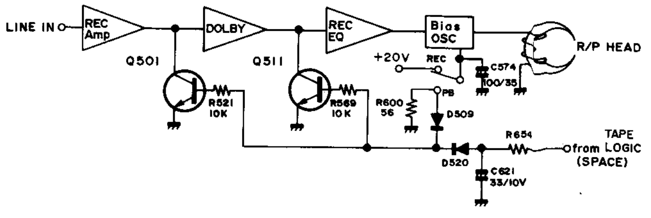

LINE IN
REC
Amp
DOLBY
REC
EQ
Bias
OSC
R/P HEAD
Q501
Q511
+20V
REC
C574
100/35
PB
R521
10K
R569
10K
R600
56
D509
R654
TAPE
from LOGIC
(SPACE)
D520
C621
33/10V

Figure 35–4

4.2.8 **APSS Circuit** (Refer to Figure 36)

Coming out of the playback equalizer amplifier, composite signal of R-ch. and L-ch. is applied to the IC505 to be amplified: the required band-width is from 1 kHz to 50 kHz.

The signal thus amplified by the IC505 is voltage-double-rectified by the D511 and D512 so that the Q518 is turned on while the Q519, off. When the tape reaches a part having no signal the Q518 is turned off while the Q519, on, however. At the time, there arises a current charged by the R614 and C591 lowering the base potential of Q520, so that this transistor Q520 is turned off in an instant: a pulse is thus caused to be applied, as APSS signal, to the logic control circuit.

The Q548 is so designed as to be kept on during Play and Record modes, which prevents APSS signal (pulse) from occurring. The Q518 and Q519 are a level comparator circuit.

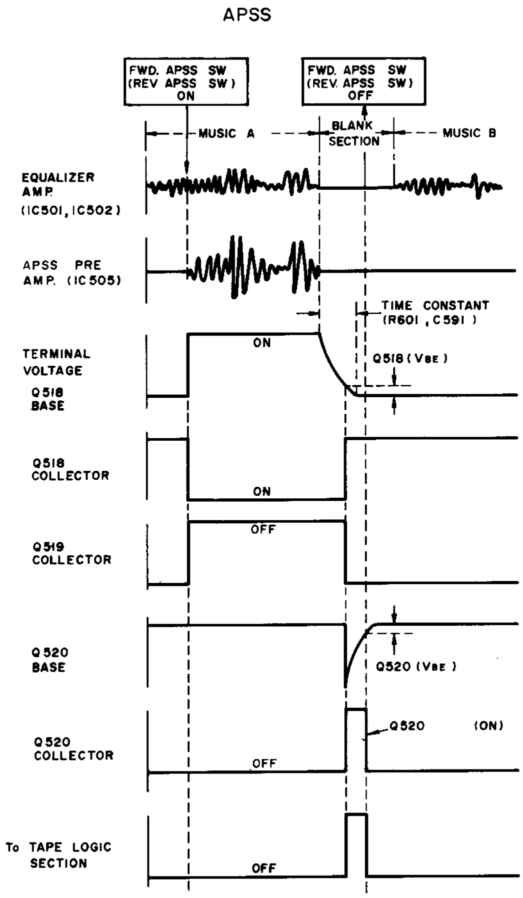

APSS
FWD. APSS SW (REV APSS SW) ON
FWD. APSS SW (REV. APSS SW) OFF
MUSIC A
BLANK SECTION
MUSIC B
EQUALIZER AMP. (IC501, IC502)
APSS PRE AMP. (IC505)
TIME CONSTANT (R601, C591)
TERMINAL VOLTAGE
Q518 BASE
ON
Q518 (VBE)
Q518 COLLECTOR
ON
Q519 COLLECTOR
OFF
Q520 BASE
Q520 (VBE)
Q520 COLLECTOR
OFF
Q520 (ON)
To TAPE LOGIC SECTION
OFF

Figure 36–1

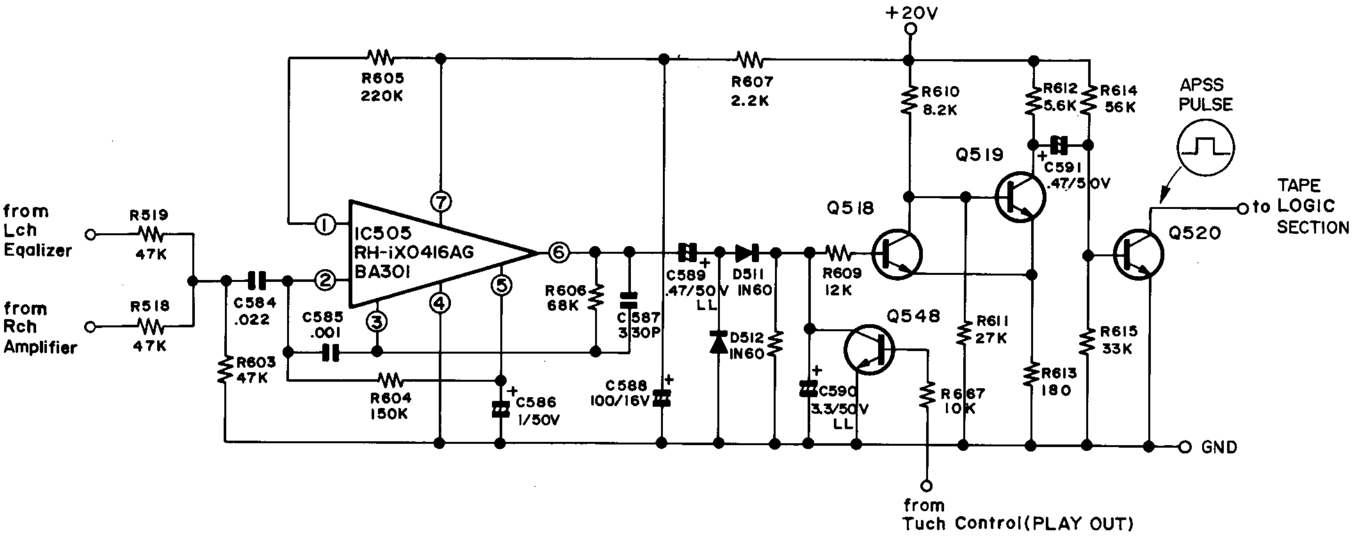

+20V
R605 220K
R607 2.2K
R610 8.2K
R612 5.6K
R614 56K
APSS PULSE
Q519
C591 .47/50V
TAPE to LOGIC SECTION
Q518
Q520
from Lch Eqalizer
R519 47K
from Rch Amplifier
R518 47K
IC505 RH-iX0416AG BA301
①
②
③
④
⑤
⑥
⑦
C584 .022
C585 .001
R603 47K
R604 150K
C586 1/50V
R606 68K
C587 330P
C588 100/16V
C589 .47/50V LL
D511 IN60
D512 IN60
R609 12K
Q548
C590 3.3/50V LL
R611 27K
R667 10K
R613 180
R615 33K
GND
from Tuch Control(PLAY OUT)

Figure 36–2

5. TOUCH CONTROL CIRCUIT (Refer to Figure 37)

5. 1 SYNOPSIS

- This model SG-500H features the following function switches and control switches which are all of so-called touch sensor system: different from the conventional mechanically-operated ones, these switches can be effected only with too light figner-touch operation thanks to the employment of newly developed touch sensor IC's and electrodes (LED included).
  - ON/STAND-BY
  - FUNCTION SELECTOR
    MIC/AUX, PHONO, TAPE, FM, SW, MW, LW
  - CONTROL BUTTON
    PHONO-PLAY, CUT, REPEAT
    TAPE-STOP, PLAY, RWD, FF, PAUSE, SPACE, RECORD, APSS REV, APSS FWD
  - FM PRESET
    U1 ~ U7, MANUAL
- With the auto play system employed, the set is permitted to automatically start playing as soon as the function selector is set at "PHONO" and/or "TAPE" position. On the other hand, if the setting of the function selector is changed from "PHONO" and/or "TAPE" to other positions, the set automatically stops playing, getting in Stop mode.
- The configuration of the touch control circuit is as shown in Fig. 37. In this figure, it is the power on/stand-by circuit and FM preset memory that are designed to receive a drive power from the preheating circuit: this design is for a speedier operation of the succeeding circuits. These circuits get in action when the main power switch is turned on.
- Even when the stand-by switch is turned on, any of the function is not yet in selection. As to the FM preset memory, a power of 15 V is always supplied to its IC703, IC704 pin ⑦ from the pre-heating circuit, for the purpose of protecting the memorized contents.

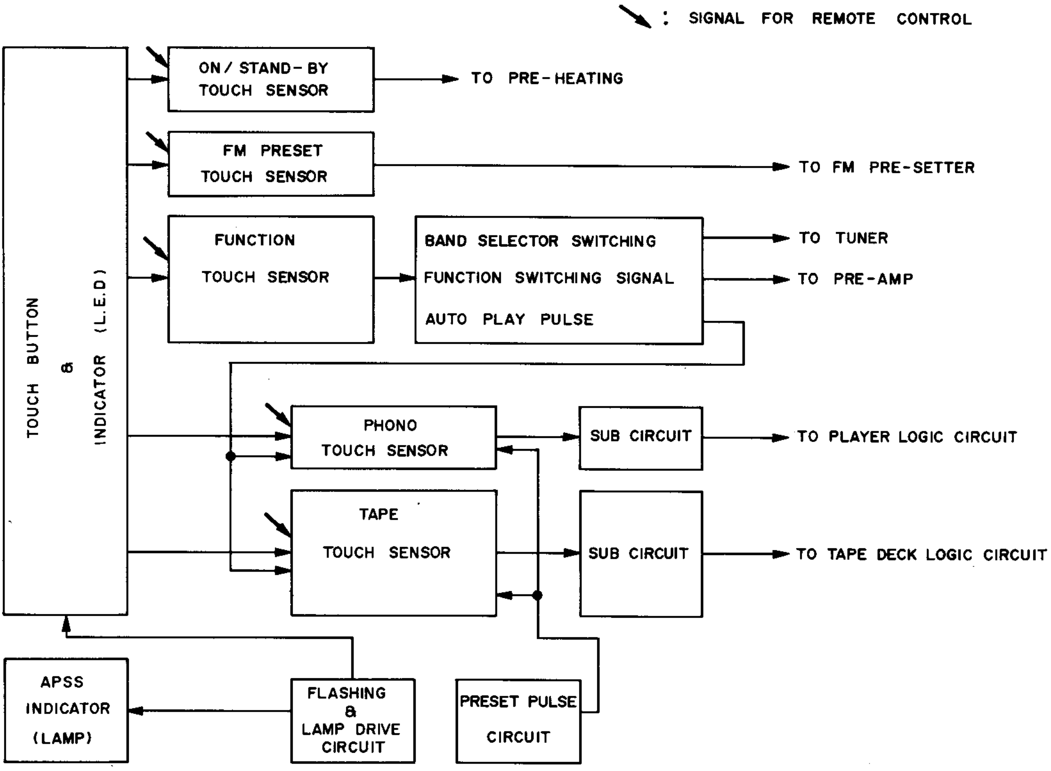

: SIGNAL FOR REMOTE CONTROL
TOUCH BUTTON & INDICATOR (L.E.D)
ON/STAND-BY TOUCH SENSOR
TO PRE-HEATING
FM PRESET TOUCH SENSOR
TO FM PRE-SETTER
FUNCTION TOUCH SENSOR
BAND SELECTOR SWITCHING
FUNCTION SWITCHING SIGNAL
AUTO PLAY PULSE
TO TUNER
TO PRE-AMP
PHONO TOUCH SENSOR
SUB CIRCUIT
TO PLAYER LOGIC CIRCUIT
TAPE TOUCH SENSOR
SUB CIRCUIT
TO TAPE DECK LOGIC CIRCUIT
APSS INDICATOR (LAMP)
FLASHING & LAMP DRIVE CIRCUIT
PRESET PULSE CIRCUIT

Figure 37—1

5. 2 TOUCH SENSOR IC

5. 2. 1 Kinds of Touch Sensor IC's

Each touch sensor IC is composed of touch amplifier and latch circuit (flip-flop) : the flip-flop is to logically handle the amplified output. There are the following three kinds of IC's available according to the applications.

- 4-channel ganged type (M51232P)
  The function selector switch is of this type: if any one of the functions MIC/AUX, PHONO, TAPE, etc. is selected, other functions are all turned off.
- 4-channel separate type (M54620P)
  The space switch, for example, is of this type: it can be turned on and off separately without affecting other switches.
- Toggle type (M54621L)
  The on/stand-by switch and repeat switch, for example, are of this type: each of this type is turned on by pushing once and off by pusing twice.

5. 2. 2 Touch Amplifier Circuit (Refer to Figure 38–1)

When one touches the touch plate (button), his body's resistance R_T is caused to be applied to the inner circuit and therefore a current I_B is produced to run in the base of Q_1 inside the touch sensor IC, via the R_1 and R_T. With this base current, the Q_1 is turned on and a collector current of Q_1' is then caused by the power supply V_S to flow in the base of the next-stage Darlington-coupled amplifier (Q_3 and Q_4), so that these transistors Q_3 and Q_4 are both turned on and there develops voltage (0 level) at the collector. This voltage is then applied to the next-stage flip-flop circuit or Schmidt trigger circuit.

- The required input current to activate each IC is set at 0.35 μA max.
- With a human body-induced resistance of less than 16 M ohm, the circuit is allowed to operate.
- The R_1 is to prevent higher voltage from coming in from the exterior, the C_B is to prevent misoperation due to noises and the R_2 is used for adjusting the touch control sensitivity.

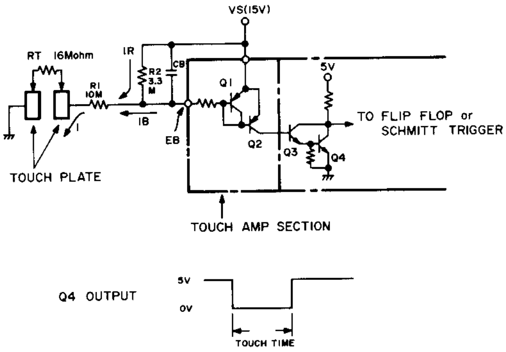


Figure 38–1

5. 2. 3 Output Circuit (Refer to Figure 38–2)

For any of the three kinds of touch sensor IC's, the output circuit is made an open collector type: when the selected IC gets in action, the output signal becomes low level with respect to ground level. The rated sink current is of 40 mA and the corresponding output voltage (with the signal at low level) becomes about 0.4 V max.

Channel-Lock Terminal

For any of the three kinds of touch sensor IC's, the channel-lock circuit is provided in front of the touch amplifier.

It is so designed that when this terminal is set at high level or opened, no input signal is applied to the touch amplifier: the input signal is effective as far as this terminal is at low level.

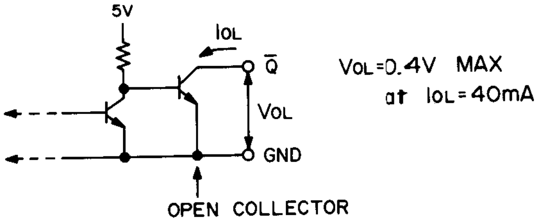


Figure 38–2

5. 2. 4 4-Channel Ganged Type (M51232P) (Refer to Figure 39–1)

Coming out of one touch button, the signal is applied to the pin ⑪ and only when the pin ⑮ is at zero (0) level, this signal is allowed to enter the touch amplifier A then to be transferred to the set input terminal of the R-S type flip-flop circuit to be held at one state: under this condition, the output Q is kept at zero (0) level. Next, coming out of another touch button, if the signal is applied to another touch amplifier, its output signal makes the flip-flop circuit be held to one state; simultaneously the common reset signal coupled with the pin ⑧ is applied to each reset input terminal of the other three flip-flop circuits to get, in turn, in reset mode.

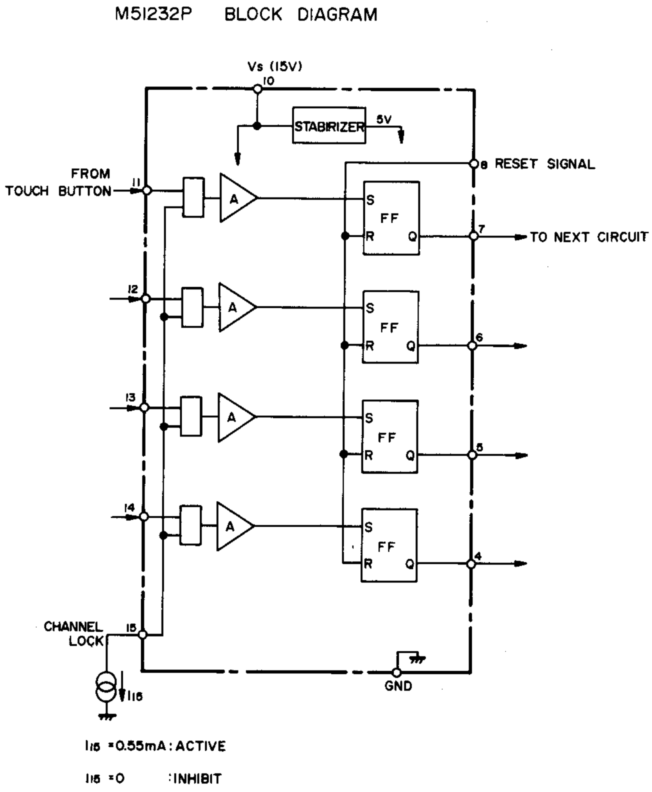

M51232P BLOCK DIAGRAM
Vs (15V)
10
STABIRIZER
5V
8 RESET SIGNAL
FROM
TOUCH BUTTON
11
A
S
FF
R
Q
7
TO NEXT CIRCUIT
12
6
13
5
14
4
CHANNEL
LOCK
15
GND
I15
I15 =0.55mA : ACTIVE
I15 =0 : INHIBIT

Figure 39–1

5. 2. 5 4-Channel Separate Type (M54620P) (Refer to Figure 39–2)

The space, pause, APSS REV and APSS FWD switch, for example, is this type; it can turned on and off separately without affecting other switches.

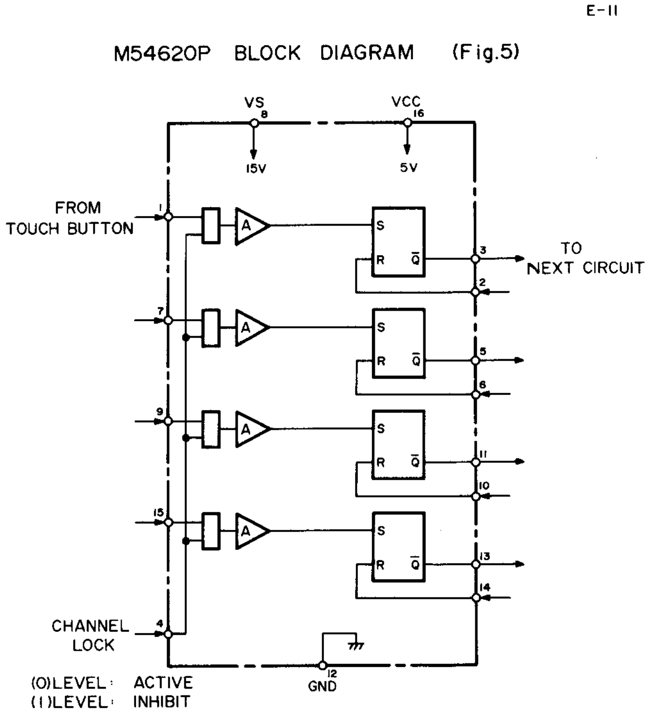

E-II
M54620P BLOCK DIAGRAM (Fig.5)
VS
8
15V
VCC
16
5V
FROM
TOUCH BUTTON
1
A
S
R
Q̄
3
TO
NEXT CIRCUIT
2
7
5
6
9
11
10
15
13
14
CHANNEL
LOCK
4
(0)LEVEL : ACTIVE
(1)LEVEL : INHIBIT
12
GND

Figure 39–2

5. 2. 6 Toggle Type (M54621L) (Refer to Figure 40–1)

Going out of the touch amplifier, the signal is applied once to the Schmidt trigger circuit (to reduce chattering) and then to the T-type flip-flop circuit: this flip-flop is changed from one state to another every time the touch button is pushed, and in addition, note that changing of the states of the flip-flop is performed at a fall time of the $\overline{T}$ input waveform.

The T output terminal to make zero-level signal be effective only when the touch button is pushed.

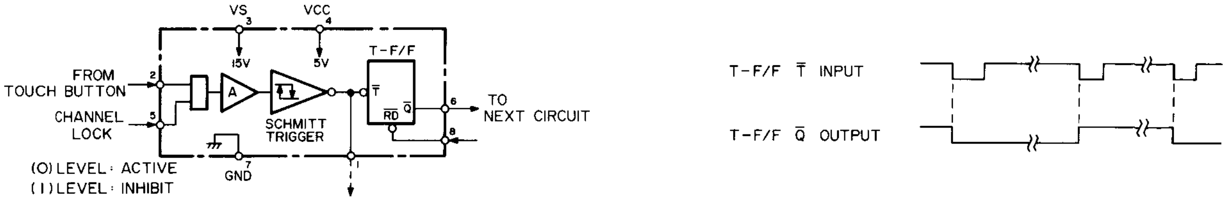

VS
3
VCC
4
15V
5V
T-F/F
FROM
TOUCH BUTTON
2
A
$\overline{T}$
$\overline{RD}$
$\overline{Q}$
6
TO
NEXT CIRCUIT
CHANNEL
LOCK
5
SCHMITT
TRIGGER
8
(O) LEVEL : ACTIVE
(I) LEVEL : INHIBIT
7
GND
1
T-F/F $\overline{T}$ INPUT
T-F/F $\overline{Q}$ OUTPUT

Figure 40–1

5. 3 CIRCUIT EXPLANATION

5. 3. 1 On/Stand-by Circuit (Refer to Figure 40–2)

The behavior of this circuit is based on the use of toggle type touch sensor IC (M54631L). When the stand-by touch button is touched, a current goes out of the IC801 ② to be applied to this sensor circuit to get in action.

The output pin ⑥ is turned on by touching the button once, and off by touching it twice. While the pin ⑥ is kept on, the PNP transistor of the auxiliary power supply section produces its base current to run in this pin ⑥ so that the relay is conducted turning on a main power. In Fig. 40–2, the part (1) indicated by dotted line refers to the CR filter which is to prevent mis-operation due to hum noises possibly caused when the touch button is operated, and the C828 is a capacitor to reduce chattering to the minimum. The circuit (2) indicated by dotted line is for the purpose to enable a stabilized reset operation when the auxiliary power is turned on. The R804 and ZD801 serve to apply a power of 5 V to the pin ④.

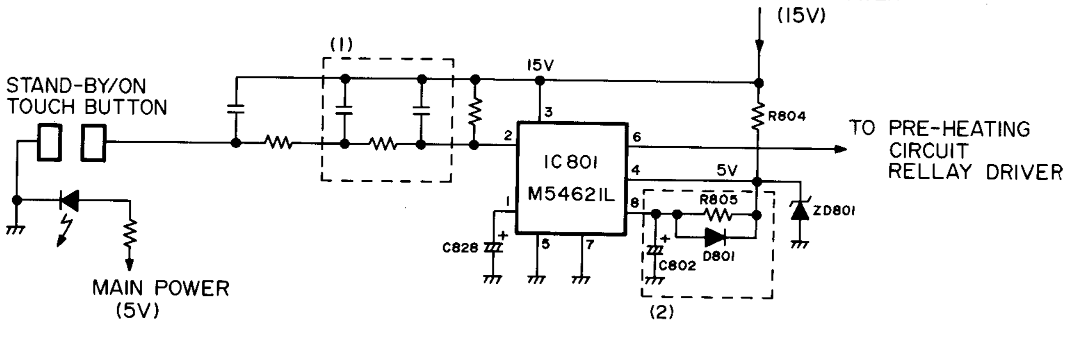

PRE-HEATING POWER
(15V)
(1)
15V
STAND-BY/ON
TOUCH BUTTON
3
2
6
R804
TO PRE-HEATING
CIRCUIT
RELLAY DRIVER
IC801
M54621L
4
5V
1
8
R805
ZD801
C828
5
7
C802
D801
MAIN POWER
(5V)
(2)

Figure 40–2

5. 3. 2 Function Touch Sensor Circuit and Others Concerned

(Refer to Figure 41)

This section makes use of two touch sensor IC's (M51232P).

The output of this touch sensor is passed on to each of the function switching signal circuit, auto play pulse signal circuit and band selector switching circuit. In the discussion that follows, we will explain how this section operates by taking up two examples: (1) when the PHONO button is touched and (2) when the FM button is touched.

When the PHONO button is touched, the phono channel is turned on and the output signal at the pin ⑥ of IC701 is changed from (1) level to (0) level. As a result, the base of Q801 which has been turned on is cut off so that its collector output signal is changed from 0 V to 33 V: this signal is transferred, as a function switching signal, to the preamplifier. Meanwhile, the said signal directly coming out of the PHONO button is also applied to the pin ⑫ of IC804 so that the output signal at the pin ⑫ is changed from (1) level to (0) level. At the time, there develops a signal having the pulse waveform as shown in the figure hereof so that the pin ⑩ of IC803 gets in (0) level instantly: this output signal is coupled to the phono play touch sensor. Therefore, the pin ⑬ of the play sensor IC806 gets in (0) level and the output signal is applied to the disc player to start playing: this refers to as Auto Play System featured by the set. When the function "PHONO" is in selection, if another function button is touched, the pin ⑥ of IC701 becomes (1) level and the pin ⑫ of IC804 is changed from (1) level to (0) level, causing a pulse signal shown in the figure hereof: the result is that the pin ⑫ of IC803 gets in (0) level instantly and the output signal is applied, as a cut-off signal, to the pin ⑪ of IC806 to become (0) level.

Next, when the FM touch button is touched, the FM channel is turned on and the output signal at the pin ⑦ of IC702 is changed from (1) level to (0) level. Accordingly, the Q804 is cut off in the same way as in the above case and the collector output signal goes to high level, then to be applied to the function switching circuit of the preamplifier. Speaking of the Q805 being of PNP type, its base potential becomes (0) level so that the transistor itself is turned on and a power of 12 V appearing at the collector is supplied to the FM tuner section.

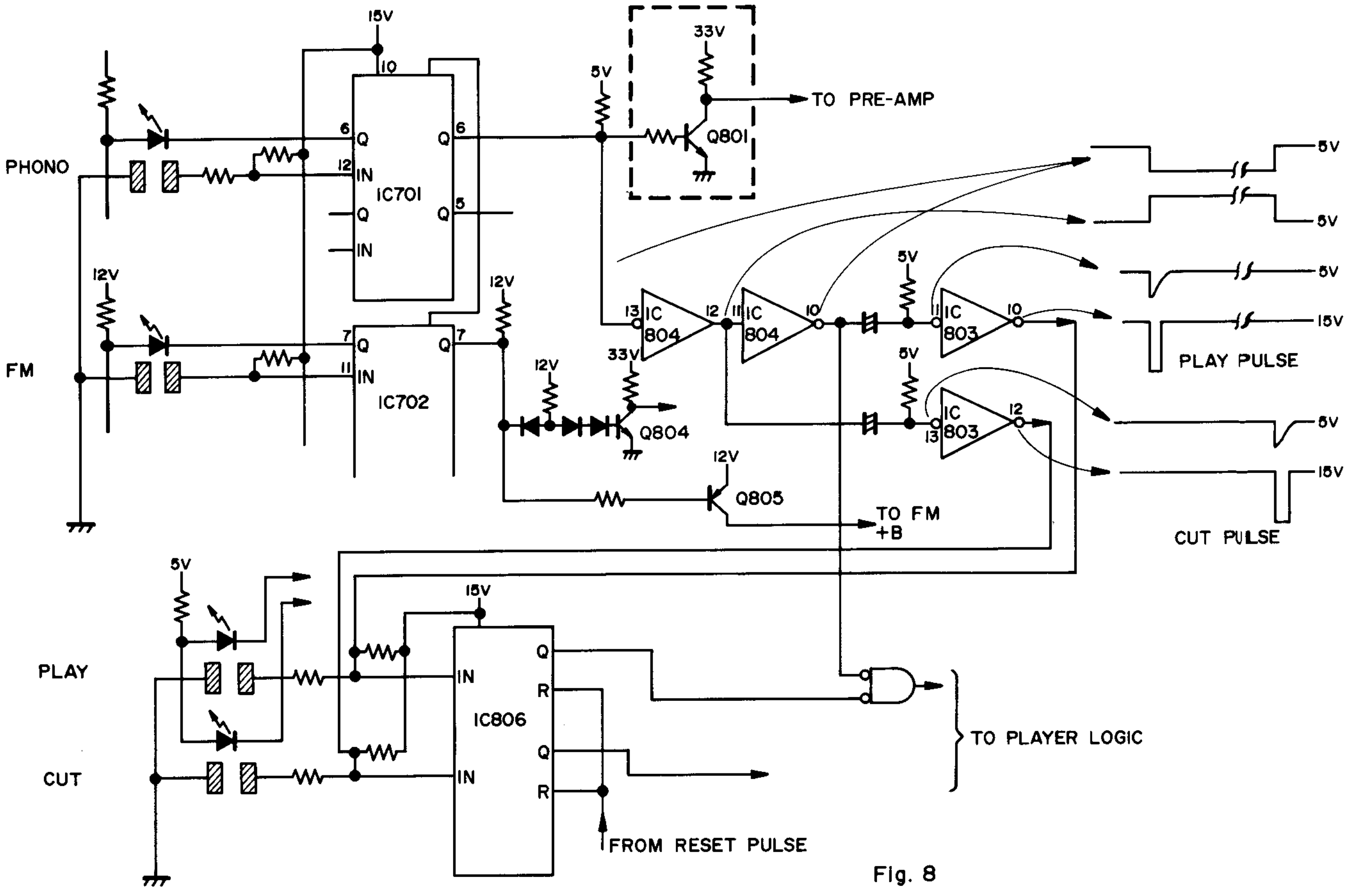


Fig. 8

Figure 41—1

5. 3. 3 Reset Pulse Oscillator (Refer to Figure 42–1)

This circuit is to apply reset signal to the $\overline{\mathrm{RD}}$ terminal in each of the IC806 and IC809: it is in this way that the output signal is kept at (0) level as long as the touch button is being touched.

Output signal of the astable multivibrator composed of IC804-C, D and C·R is supplied via CR differentiation circuit to the transistor inverter where there develops negative reset pulse signal.

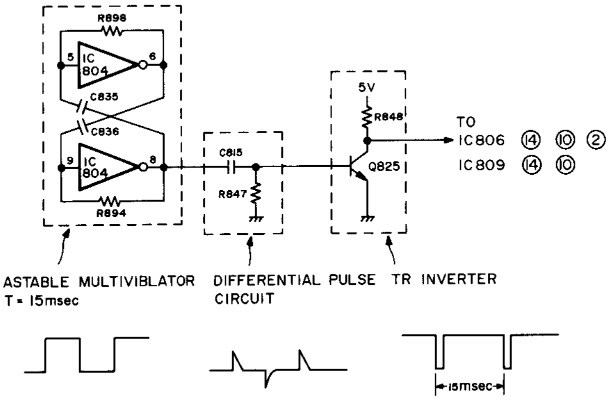

R898
5
IC
804
6
C835
C836
9
IC
804
8
R894
C815
R847
5V
R848
Q825
TO
IC806 ⑭ ⑩ ②
IC809 ⑭ ⑩
ASTABLE MULTIVIBLATOR
T = 15msec
DIFFERENTIAL PULSE
CIRCUIT
TR INVERTER
15msec

Figure 42–1

5. 3. 4 Flashing Signal Oscillator (Refer to Figure 42–2)

This circuit is provided to enable flashing of the repeat and pause LED indicators, and APSS REV and APSS FWD indicator lamps: the structure is of an astable multivibrator consisting of two transistors Q822 and Q823. This oscillator circuit is made always ready for the operation.

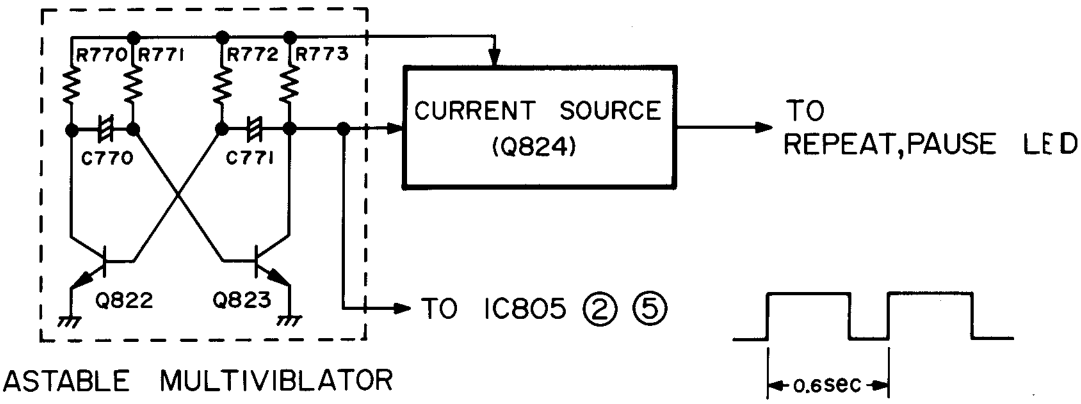

R770
R771
R772
R773
C770
C771
Q822
Q823
CURRENT SOURCE
(Q824)
TO
REPEAT,PAUSE LED
TO IC805 ② ⑤
ASTABLE MULTIVIBLATOR
0.6sec

Figure 42–2

6. PLAYER

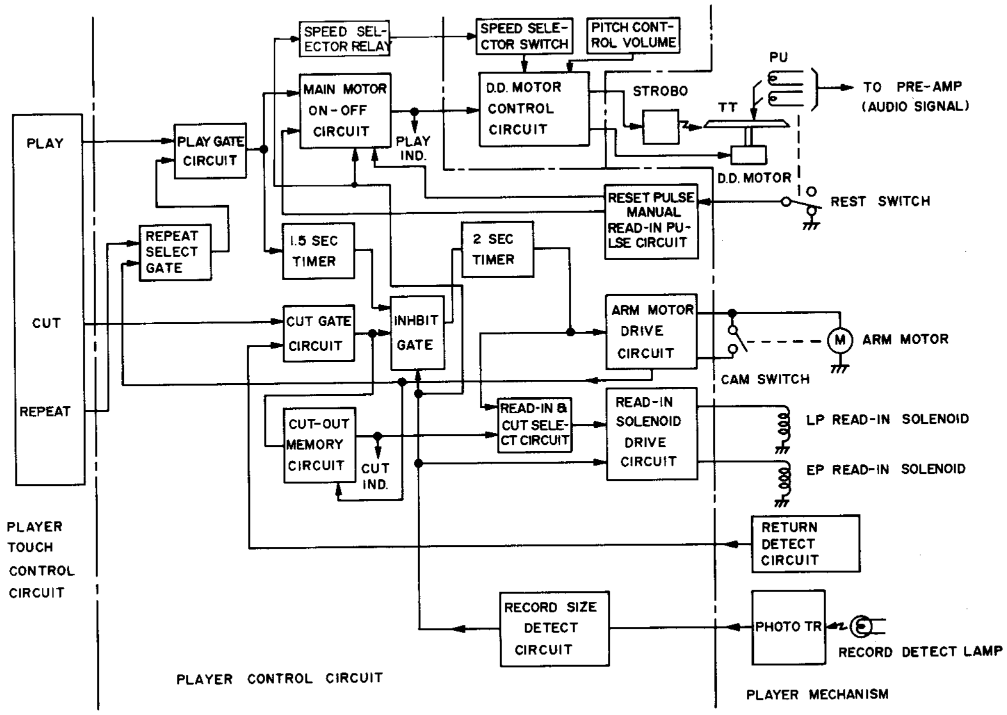

PLAY
CUT
REPEAT
PLAYER TOUCH CONTROL CIRCUIT
PLAY GATE CIRCUIT
REPEAT SELECT GATE
SPEED SELECTOR RELAY
MAIN MOTOR ON-OFF CIRCUIT
PLAY IND.
1.5 SEC TIMER
CUT GATE CIRCUIT
INHBIT GATE
CUT-OUT MEMORY CIRCUIT
CUT IND.
SPEED SELECTOR SWITCH
PITCH CONTROL VOLUME
D.D. MOTOR CONTROL CIRCUIT
STROBO
2 SEC TIMER
RESET PULSE MANUAL READ-IN PULSE CIRCUIT
ARM MOTOR DRIVE CIRCUIT
READ-IN & CUT SELECT CIRCUIT
READ-IN SOLENOID DRIVE CIRCUIT
RECORD SIZE DETECT CIRCUIT
PLAYER CONTROL CIRCUIT
PU
TT
TO PRE-AMP (AUDIO SIGNAL)
D.D. MOTOR
REST SWITCH
M
ARM MOTOR
CAM SWITCH
LP READ-IN SOLENOID
EP READ-IN SOLENOID
RETURN DETECT CIRCUIT
PHOTO TR
RECORD DETECT LAMP
PLAYER MECHANISM

Figure 43–1

6.1 SYNOPSIS (Refer to Figure 43)

- This player is a full automatic player equipped with the control logic circuit: receiving the signals caused by touching the PLAY, CUT or REPEAT buttons, this control logic circuit is to automatically enable the said three operations and the auto-return operation.
- A mechanical feature of this player is the employment of 2-motor drive system (with an independent arm motor included).

6. 2 ARM MOTOR DRIVE and SOLENOID CONTROL

(Refer to Figure 44–1)

- A disc read-in operation is the same for either LP (33 rpm) or EP (45 rpm) disc except for the moving direction of the solenoid: the arm motor and solenoid start to move simultaneously.
- The solenoid continues its action for 2 seconds.
- The arm motor continues to rotate until the read-in operation is ended.
- For the cut-off operation, only the arm motor gets in motion but not the solenoid.

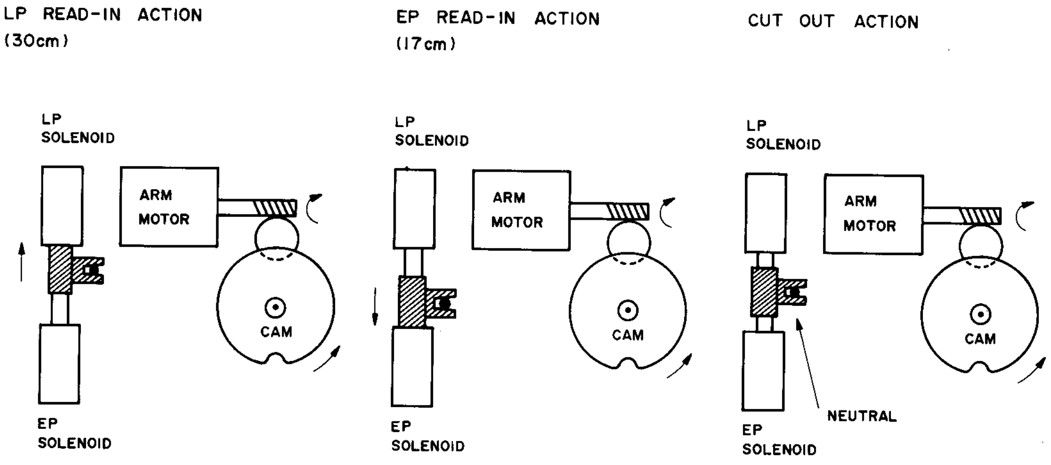

LP READ-IN ACTION
(30cm)
LP SOLENOID
ARM MOTOR
CAM
EP SOLENOID
EP READ-IN ACTION
(17cm)
LP SOLENOID
ARM MOTOR
CAM
EP SOLENOID
CUT OUT ACTION
LP SOLENOID
ARM MOTOR
CAM
NEUTRAL
EP SOLENOID

Figure 44–1

6. 3 RECORD SIZE DETECT CIRCUIT (Refer to Figure 44–2)

The prism lamp, turntable's prism and photo transistor located below the turntable are to detect the size (30 cm or 17 cm) of a disc in playing or to find out an absence of it, and the output signal is applied to the control logic circuit so that a playing is stopped when no disc is placed on the turntable, and if, on the other hand, there is a disc on the turntable, the LP/EP solenoid is controlled according to said size detection

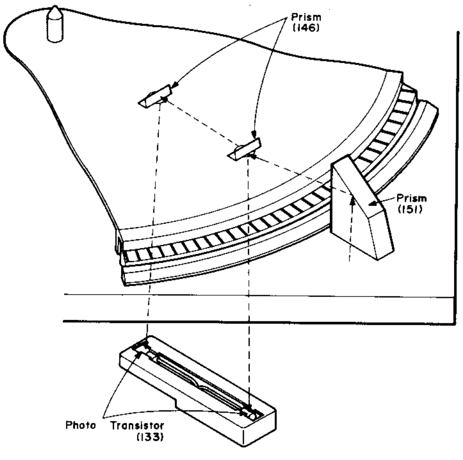

Prism
(146)
Prism
(151)
Photo Transistor
(133)

Figure 44–2

6.4 AUTO RETURN DETECT CIRCUIT (Refer to Figure 45)

(1) Arm Speed Detect Circuit

When the disc reaches nearly its final grooved part, the shutter attached to the rear of the arm tends to enter between the LED and photo transistor, and as a result, the collector voltage of the photo transistor will be changed as shown in Fig. 45–1–Ⓐ.

The voltage at the Ⓐ is applied to the C_1 and there develops output signal shown in fig. 45–1–Ⓑ. This voltage increases as the arm moving speed becomes faster.

(2) Voltage Comparator

The reference voltage Ⓒ is applied to the terminal ② of IC-1 (operational amplifier) and that Ⓑ, to the terminal ③.

(3) Return Pulse Generator

The output signal of IC-1 is differentiated here to be transformed into the one Ⓔ, and this signal Ⓔ is pulse-amplified by the TR1 and TR2 to generate pulse signal Ⓕ.

(4) Reference Voltage Selector

The output Ⓑ is needed to vary according to LP (33 rpm) or EP (45 rpm) disc in playing and to meet this variation,the reference voltage is also changed in this section: for the 33 rpm disc, the TR4 is turned on and the RV_2 and R_{15} gets, in turn, in a parallel connection to lower the voltage Ⓒ.

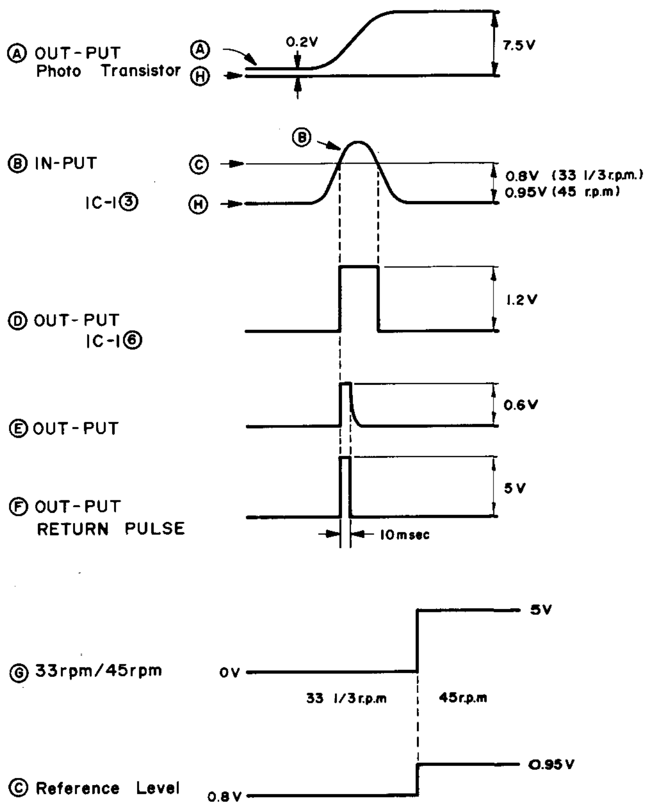


Figure 45–1

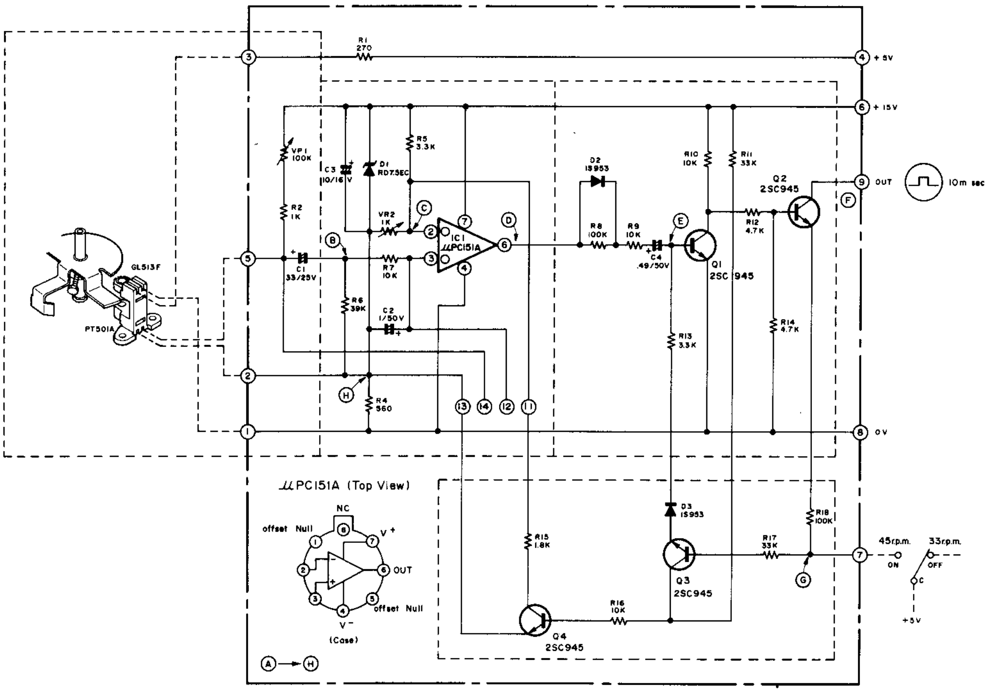

GL513F
PT501A
R1 270
VP1 100K
R2 1K
C3 10/16V
D1 RD7.5EC
R5 3.3K
VR2 1K
C1 33/25V
R7 10K
R6 39K
C2 1/50V
R4 560
IC1 μPC151A
Ⓑ
Ⓒ
Ⓓ
Ⓗ
D2 1S953
R8 100K
R9 10K
C4 .49/50V
Ⓔ
R10 10K
R11 33K
Q1 2SC945
Q2 2SC945
R12 4.7K
R14 4.7K
R13 3.3K
Ⓕ
+5V
+15V
OUT
10m sec
0V
D3 1S953
R15 1.8K
R16 10K
R17 33K
R18 100K
Q3 2SC945
Q4 2SC945
Ⓖ
45r.p.m.
33r.p.m.
ON
OFF
C
+5V
μPC151A (Top View)
NC
offset Null
V+
OUT
offset Null
V−
(Case)
Ⓐ→Ⓗ

Figure 45–2

6.5 AUTO SPEED DETECT CIRCUIT (Refer to Figure 46–1)

Coming out of the record size detect circuit, the signal is applied to the 33 rpm/45 rpm speed selector relay to switch over the D.D. motor control circuit.

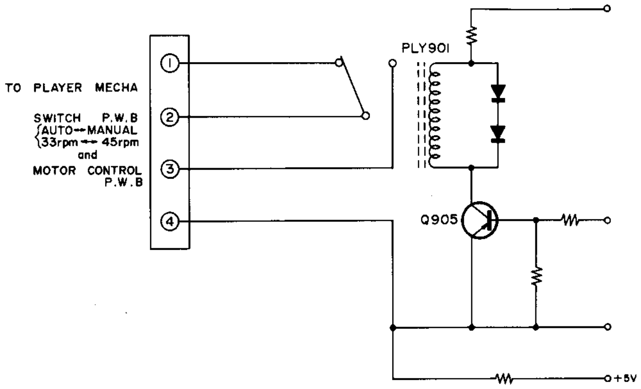

TO PLAYER MECHA
SWITCH P.W.B
(AUTO↔MANUAL
33rpm↔45rpm)
and
MOTOR CONTROL
P.W.B
①
②
③
④
PLY901
Q905
+5V

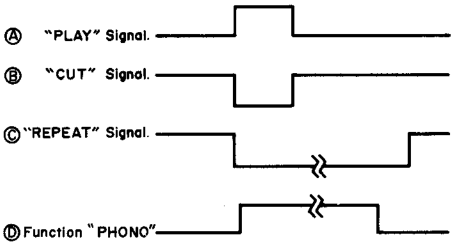
Figure 46–1

6.6 PLAYER CONTROL CIRCUIT

6.6.1 Control Pulse and Time/Mode Chart (Refer to Figures 46–2 and –3)

The signal Ⓓ shown in Fig. 46–2 serves to inhibit the manual play under other modes than phono mode.

PLAYER CONTROL INPUT SIGNAL


Ⓐ "PLAY" Signal.
Ⓑ "CUT" Signal.
Ⓒ "REPEAT" Signal.
Ⓓ Function "PHONO".

PHONO

INPUT / MODE	PLAY	CUT	REPEAT
"OFF"	PLAY	——	REPEAT
PLAY	——	CUT	PLAY REPEAT
CUT	——	——	CUT REPEAT
REPEAT	PLAY REPEAT	——	OFF

Figure 46–2

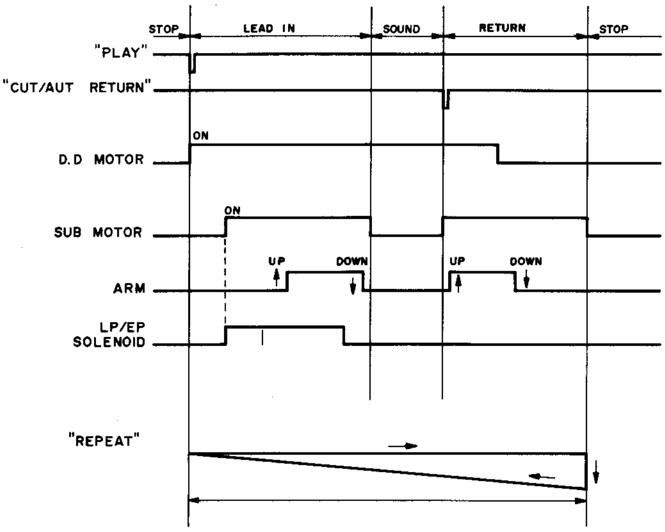

STOP
LEAD IN
SOUND
RETURN
STOP
"PLAY"
"CUT/AUT RETURN"
ON
D.D MOTOR
ON
SUB MOTOR
UP
DOWN
UP
DOWN
ARM
LP/EP
SOLENOID
"REPEAT"

Figure 46–3

6.6.2 Play Gate Circuit (Refer to Figure 47–1)

During read-in operation or playing, this circuit functions to inhibit a generation of play signals.

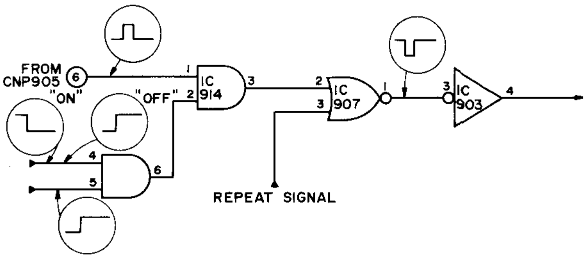

FROM CNP905 ⑥
"ON"
"OFF"
1
2
IC 914
3
4
5
6
2
3
IC 907
1
3
IC 903
4
REPEAT SIGNAL

Figure 47–1

6.6.3 1.5 sec Timer (Refer to Figure 47–2)

This circuit is to provide a duration of 1.5 seconds from when there appears a play signal until the D.D. motor starts to rotate simultaneously with the record size detect circuit functionning.

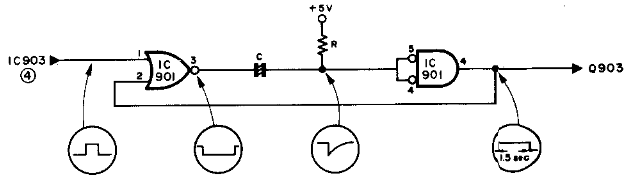

IC903 ④
1
2
IC 901
3
C
+5V
R
5
IC 901
4
4
Q903
1.5 sec

Figure 47–2

6.6.4 2 sec Timer (Refer to Figure 47–3)

With a disc to be played, the sub-motor starts to rotate and this circuit is to enable the solenoid to move for 2 seconds. The sub-motor will be stopped by the cam switch.

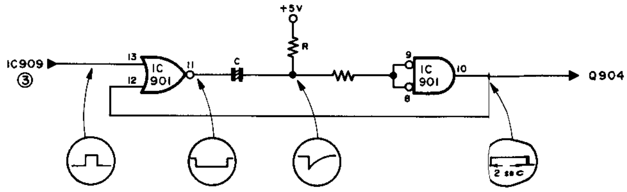

IC909 ③
13
12
IC 901
11
C
+5V
R
9
IC 901
10
8
Q904
2 sec

Figure 47–3

6.6.5 D.D. Motor On/Off Circuit (Refer to Figure 47–4)

In both Auto Play mode and Manual Play mode, this motor on/off circuit starts to function: a power applied via the drive circuit to the D.D. motor circuit.

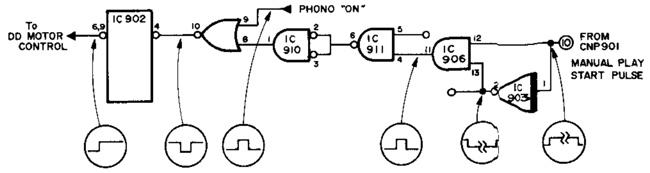
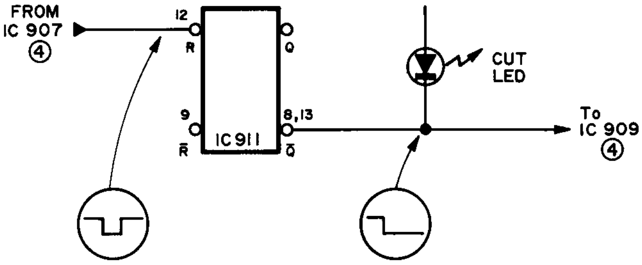

To DD MOTOR CONTROL
6,9
IC 902
4
10
9
8
PHONO "ON"
1
IC 910
2
3
6
IC 911
5
4
11
IC 906
12
13
2
IC 903
1
⑩ FROM CNP901
MANUAL PLAY START PULSE

Figure 47–4

6. 6. 6 Cut-Out Memory Circuit (Refer to Figure 48–2)
While the set is in cut-out condition, this memory circuit functions to memorize this condition, which inhibits an action of the solenoid. Also, the circuit produces a signal to make the "CUT" LED indicator light up.


FROM
IC 907
④
12
R
Q
9
R̄
IC911
8,13
Q̄
CUT
LED
To
IC 909
④

CUT GATE CIRCUIT

Figure 48–1

6. 6. 7 Cut Gate Circuit (Refer to Figure 48–2)
While the set is in cut-out or read-in condition, this gate circuit inhibits an entry of the cut signal. And the circuit is to transfer the auto-return signal to the cut-out memory circuit.

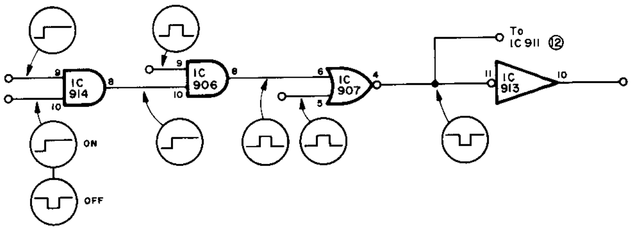

9
IC
914
8
10
ON
OFF
9
IC
906
8
10
6
IC
907
5
4
To
IC 911 ⑫
11
IC
913
10

Figure 48–2

6. 6. 8 Read-In and Cut Select Circuit (Refer to Figure 48–3)
While the set is in read-in operation, this circuit enables both the sub-motor and solenoid to move. Under cut-out condition, the circuit allows only the sub-motor to move, however.

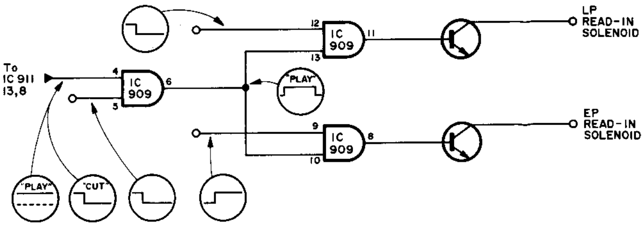

To
IC 911
13,8
4
IC
909
5
6
12
IC
909
13
11
"PLAY"
9
IC
909
10
8
"PLAY"
"CUT"
LP
READ-IN
SOLENOID
EP
READ-IN
SOLENOID

Figure 48–3

6. 6. 9 **Inhibit Gate** (Refer to Figure 49–1)

This gate is located before the 2 sec timer circuit and serves to inhibit the read-in operation when no disc is placed on the turntable.

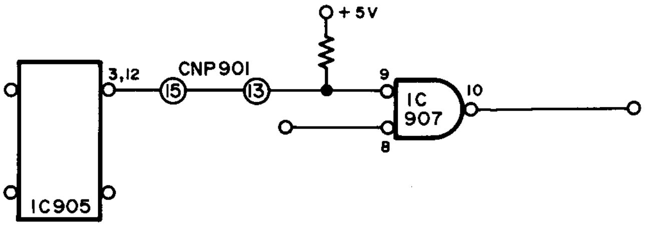

+5V
3,12
CNP901
15
13
9
IC 907
10
8
IC905

Figure 49–1

6. 6. 10 **Reset Pulse and Manual Read-In Pulse Circuit** (Refer to Figure 49–2)

In manual read-in operation, this circuit receives the signals from the reset switch which is electrically interlocked with the arm, so as to turn on the D.D. motor. And it, in turn, generates pulse signal to turn off the D.D. motor, when a playing is finished.

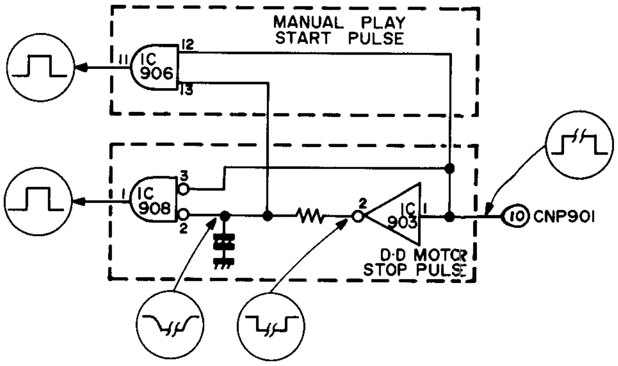
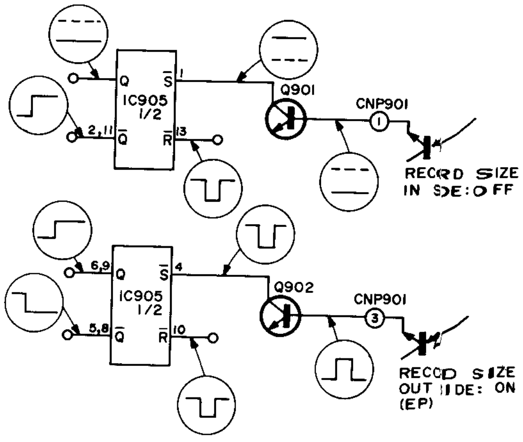

MANUAL PLAY
START PULSE
11
IC 906
12
13
3
1
IC 908
2
2
IC 903
1
10
CNP901
D·D MOTOR
STOP PULSE

Figure 49–2

6. 6. 11 **Record Size Detect Circuit** (Refer to Figure 49–3)

This circuit is to detect the size (30 cm or 17 cm) of a disc in playing according to a variation of the voltage level (high or low) of the detect photo transistor.


Q
S̄
1
IC905
1/2
2,11
Q̄
R̄
13
Q901
CNP901
1
RECORD SIZE
INSIDE: OFF
6,9
Q
S̄
4
IC905
1/2
5,8
Q̄
R̄
10
Q902
CNP901
3
RECORD SIZE
OUTSIDE: ON
(EP)

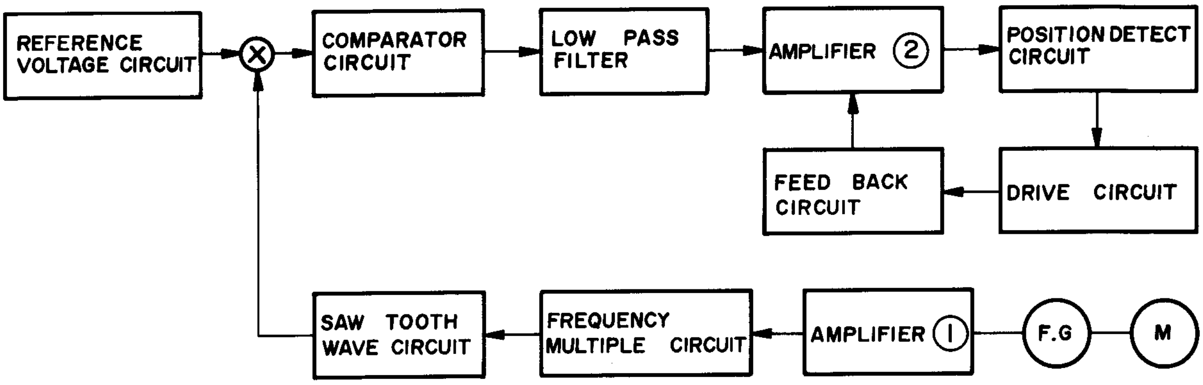
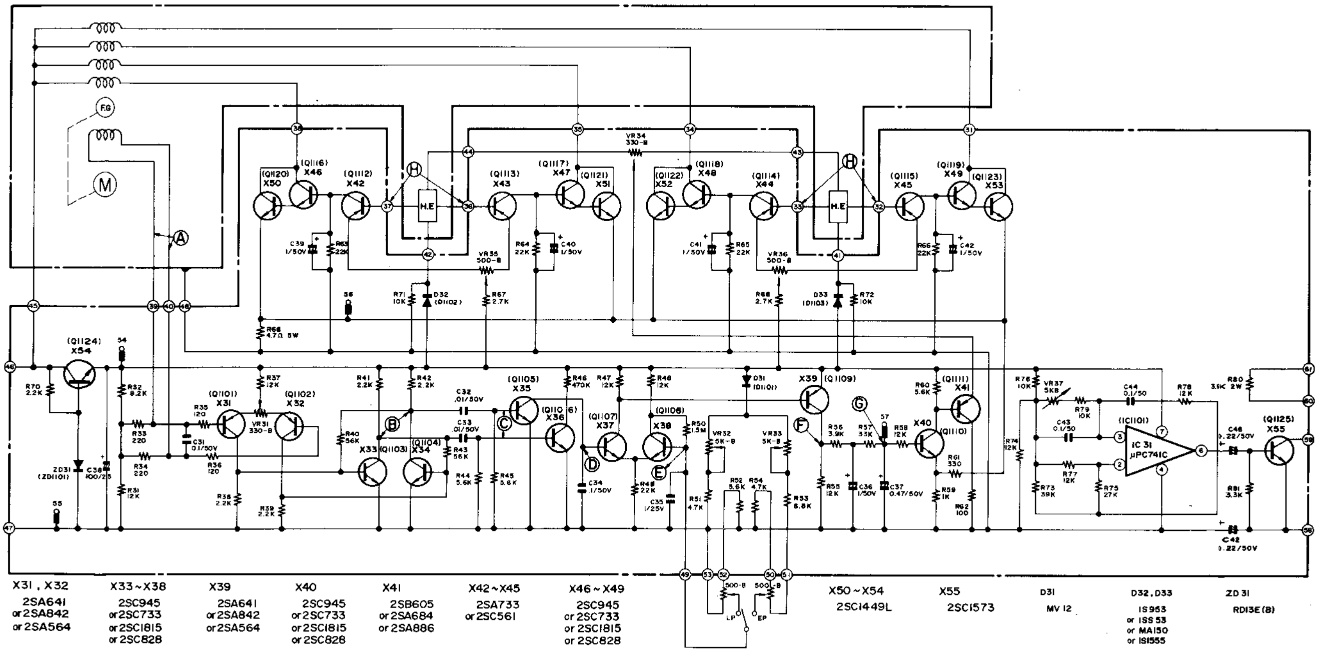

REFERENCE VOLTAGE CIRCUIT
COMPARATOR CIRCUIT
LOW PASS FILTER
AMPLIFIER ②
POSITION DETECT CIRCUIT
FEED BACK CIRCUIT
DRIVE CIRCUIT
SAW TOOTH WAVE CIRCUIT
FREQUENCY MULTIPLE CIRCUIT
AMPLIFIER ①
F.G
M

Figure 50–1

PLAYER MOTOR CONTROL UNIT


F.G
M
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
Ⓕ
Ⓖ
Ⓗ
H.E
(Q1120) X50
(Q1116) X46
(Q1112) X42
(Q1113) X43
(Q1117) X47
(Q1121) X51
(Q1122) X52
(Q1118) X48
(Q1114) X44
(Q1115) X45
(Q1119) X49
(Q1123) X53
(Q1124) X54
(Q1101) X31
(Q1102) X32
(Q1103) X33
(Q1104) X34
(Q1105) X35
(Q1106) X36
(Q1107) X37
(Q1108) X38
(Q1109) X39
(Q1110) X40
(Q1111) X41
(Q1125) X55
(IC1101) IC 31 μPC741C
VR34 330-B
VR35 500-B
VR36 500-B
VR31 330-B
VR32 5K-B
VR33 5K-B
VR37 5K-B
D31 (D1101)
D32 (D1102)
D33 (D1103)
ZD31 (ZD1101)
C38 100/25
R66 4.7Ω 5W
R80 3.9K 2W
C42 0.22/50V
C46 0.22/50V
LP
EP

X31 , X32	X33～X38	X39	X40	X41	X42～X45	X46～X49	X50～X54	X55	D31	D32, D33	ZD 31
2SA641 or 2SA842 or 2SA564	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SA641 or 2SA842 or 2SA564	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SB605 or 2SA684 or 2SA886	2SA733 or 2SC561	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SC1449L	2SC1573	MV 12	1S953 or 1SS 53 or MA150 or 1S1555	RD13E(B)

Figure 50–2

6.7 D.D. MOTOR CONTROL CIRCUIT (Refer to Figures 50–1, 50–2 and 51)

- Frequency Generator

  The frequency generator consists of 72-pole magnet, multi-gap head (having 36 pairs of yokes) and coil, and works to produce sine waves of 20 Hz and 27 Hz respectively for LP and EP discs to be played.

  LP : 0.62 V p-p
  EP : 0.84 V p-p

- Frequency Multiple Circuit

  Receiving the signals (polarity-converted one and non-polarity-converted one) from the preceeding amplifier circuit, this circuit is do differentiate them into a pulse which is featured by its high rising speed and narrow width.

- Saw Tooth Wave Circuit

  The saw tooth wave circuit is composed of capacitor and resistor (to form a charge circuit) and switching transistor (to discharge the voltage once charged by the capacitor) and it is to produce saw tooth waves each of which has the peak value proportional to the given frequency.

  LP : 4.6 B
  EP : 3.6 V

- Reference Voltage Circuit

  The reference voltage circuit is to set the motor r.p.m. according to LP or EP disc to be played: coming from the regulated voltage circuit, the voltage is voltage-divided here to become a reference voltage. The variable resistor is provided so as to vary the voltage-division ratio of this circuit thus enabiling a variation of the given frequency ––– namely, it is possible with the variable resistor to adjust the reference voltage as desired.

  LP : 4.6 V
  EP : 3.6 V

- Comparator Circuit

  This is the differential comparator circuit with a switching transistor included.

  The circuit is to compare the actual peak value of the saw tooth wave with the reference level and it is turned off or on according to whether the former value is lower than the latter or vice versa.: the result is that the frequency variation is converted into the average change of output pulses.

- Position Detect Circuit

  The position detect circuit includes two Hall elements that are to detect the disc position (say, N-pole or S-pole of the rotor's magnet) and it is thus to apply the signal to the four-phase coil. The Hall element electromotive force is controlled by its bias variation.

- Drive Circuit

  The drive circuit is to amplify the output of the Hall elements, then to be applied to the four-phase coil (Hall element electromotive force: 0.2 V p-p).

- Feedback Circuit

  The feedback circuit is to initiate a negative feedback from the drive circuit to the amplifier circuit, thus assuring a more stabilized operation of the whole circuitry.

- As shown in Fig. 50–3, the Hall elements H_1 and H_2 are to detect the 8-pole magnet being changed in polarity enabling switching of the Q_{12} to Q_{15}.
- The Hall elements generate, with this electromotive force, sine wave signal of about 0.2 V from one to another depending upon an increase and decrease of the bias.

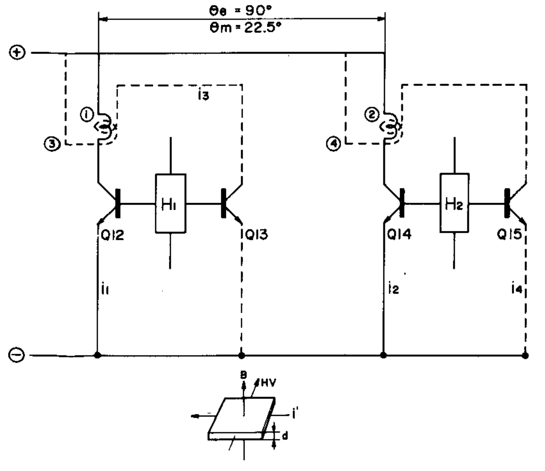

θe = 90°
θm = 22.5°
⊕
⊖
①
②
③
④
i3
H1
H2
Q12
Q13
Q14
Q15
i1
i2
i4
B
HV
I'
d

Figure 51–1

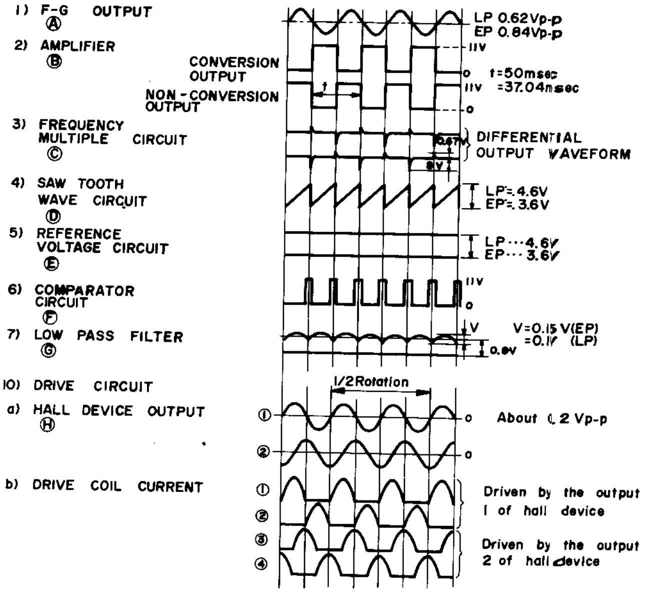

1) F-G OUTPUT Ⓐ
2) AMPLIFIER Ⓑ
CONVERSION OUTPUT
NON-CONVERSION OUTPUT
3) FREQUENCY MULTIPLE CIRCUIT Ⓒ
4) SAW TOOTH WAVE CIRCUIT Ⓓ
5) REFERENCE VOLTAGE CIRCUIT Ⓔ
6) COMPARATOR CIRCUIT Ⓕ
7) LOW PASS FILTER Ⓖ
10) DRIVE CIRCUIT
a) HALL DEVICE OUTPUT Ⓗ
b) DRIVE COIL CURRENT
LP 0.62Vp-p
EP 0.84Vp-p
11V
0
t=50msec
=37.04msec
11V
0
t
0.67V
8V
DIFFERENTIAL OUTPUT WAVEFORM
LP≒4.6V
EP≒3.6V
LP···4.6V
EP···3.6V
11V
0
V
V=0.15V(EP)
=0.1V (LP)
0.8V
1/2Rotation
①
②
③
④
0
About 0.2 Vp-p
Driven by the output 1 of hall device
Driven by the output 2 of hall device

Figure 51–2

7. FUNCTION TABLE (LEVEL)

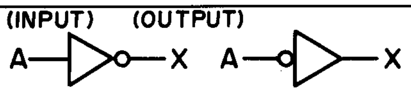
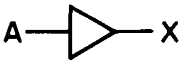
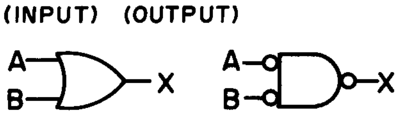
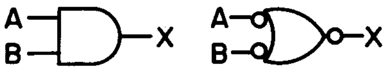
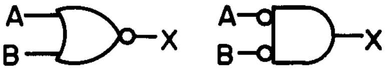
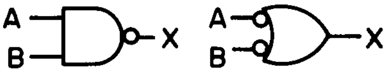
INVERTER	 (INPUT) (OUTPUT) A X A X	A X L H H L
BUFFER		A X L L H H
OR·GATE	 (INPUT) (OUTPUT) A B X A B X	A B X L L L L H H H L H H H H
AND·GATE		A B X L L L L H L H L L H H H
NOR·GATE		A B X L L H L H L H L L H H L
NAND·GATE		A B X L L H L H H H L H H H L

Figure 52–1

ALIGNMENT OF THE PLAYER SECTION

■ FREQUENCY MULTIPLE ADJUSTMENT

(Refer to Figures 53–1 and 54–2)

1. Connect the oscilloscope to the pins 55 (GND) and 57 (+).
2. Adjust the semi-variable resistor (VR1101) so that good waveform indicated in Figure 53–1.

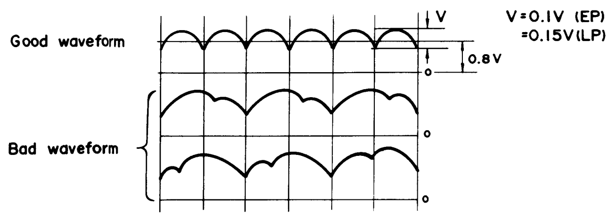

Good waveform
Bad waveform
V
V=0.1V (EP)
=0.15V(LP)
0.8V
0
0
0

Figure 53–1

■ DRIVE CIRCUIT ADJUSTMENT

1) HALL DEVICE (Refer to Figures 53–2 and 54–2)

1. Connect the oscilloscope to the pins 55 (GND) and 56 (+).
2. Adjust the semi-variable resistor (VR1104) so that good waveform indicated in Figure 53–2.

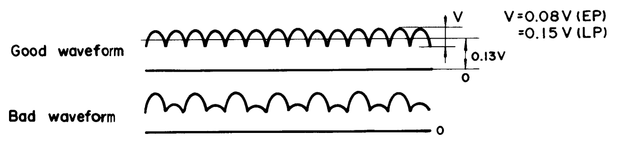

Good waveform
Bad waveform
V
V=0.08V (EP)
=0.15 V (LP)
0.13V
0
0

Figure 53–2

2) 4-COIL CURRENT (Refer to Figures 53–3 and 54–2)

1. Connect the oscilloscope to the pins 55 (GND) and 56 (+).
2. Adjust the semi-variable resistors (VR1105 and VR1106) so that good waveform indicated in Figure 53–3.

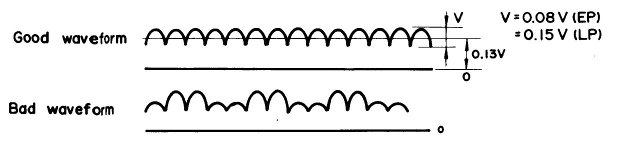

Good waveform
Bad waveform
V
V=0.08V (EP)
=0.15V (LP)
0.13V
0
0

Figure 53–3

■ STROBOSCOPE FREQUENCY ADJUSTMENT

(Refer to Figure 54–2)

1. Connect the frequency counter to the base of transistor (Q1125) and ground.
2. Adjust the semi-variable resistor (VR1107) so that the frequency counter indicate 120 Hz.

■ ARM RETURN SENSOR ADJUSTMENT

1) PHOTO TRANSISTOR (Refer to Figure 54–2)

1. Set the tonearm on the tonearm rest.
2. Connect the VTVM to the pins 13 (–) and 14 (+).
3. Adjust the semi-variable resistor (VR1001) so that the VTVM reads 0.2 V.

2) SENSOR SENSITIVITY (Refer to Figure 54–2)

1. Set the tonearm on the tonearm rest and the speed selector switch to the 33 1/3 rpm position.
2. Connect the VTVM to the pins 13 (–) and 11 (+).
3. Adjust the semi-variable resistor (VR1002) so that the VTVM reads 0.8 V.
   CHECK
   * Speed selector switch : 45 rpm –– 0.95 V

■ AUTO RETURN ADJUSTMENT

(Refer to Figure 53–4)

Adjust the eccentric pin ① when return motion is too fast (before end of performance) and the arm doesn't return even when it has near the label on the record.

■ AUTO LEAD-IN ADJUSTMENT

(Refer to Figure 53–4)

Adjust the eccentric pin ② when the stylus descends outside the record periphery and it descends inside the starting groove of the record.

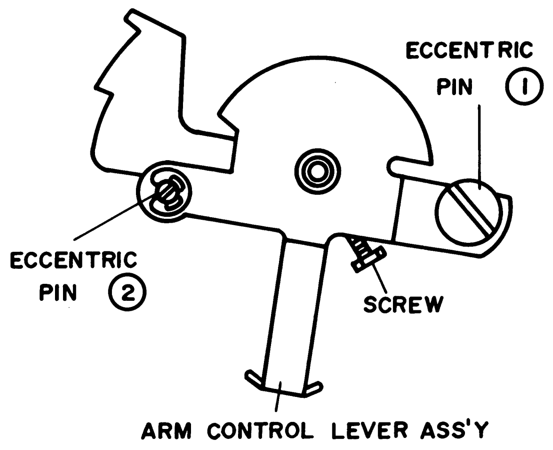

ECCENTRIC PIN ①
ECCENTRIC PIN ②
SCREW
ARM CONTROL LEVER ASS'Y

Figure 53–4

■ MOTOR'S ROTATION ADJUSTMENT

(Refer to Figures 54–1 and 54–2)

The revolutional speed of turntable minutely varies according to the hour during a day, therefore, take the following procedures to obtain an exact speed.

1. Turn the speed fine adjustment knob clockwise or anti-clockwise to adjust so that the stripe pattern of a stroboscope provided at the platter looks like stationary.
   When the stripe pattern is moving in the turning direction of platter, this shows that the rotational speed of turntable is faster than as specified.
   In this case, adjust it by turning the speed fine adjustment knob toward "S".
   Or, when the stripe pattern is moving against the turning direction of platter this shows that the turntable rotates slower than as specified. In such a case, adjust it by turning the speed fine adjustment knob toward "F".
2. When the servo-control P.W. board or other electrical parts are replaced for repairing, adjust the turntable speed in the following manner.
   1) Set the speed fine adjustment knobs to the central position.
   2) Adjust the semi-variable resistors (VR1102, VR1103) so that the stripe pattern of a stroboscope provided at the platter looks like stationary.
      VR1102 . . . . . . For 33-1/3 r.p.m. Adjust
      VR1103 . . . . . . For 45 r.p.m. Adjust

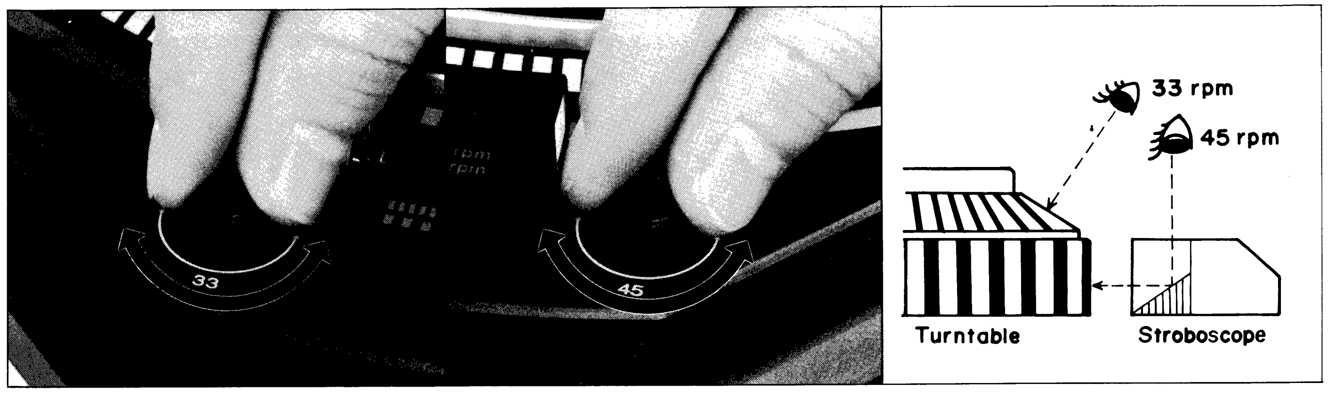
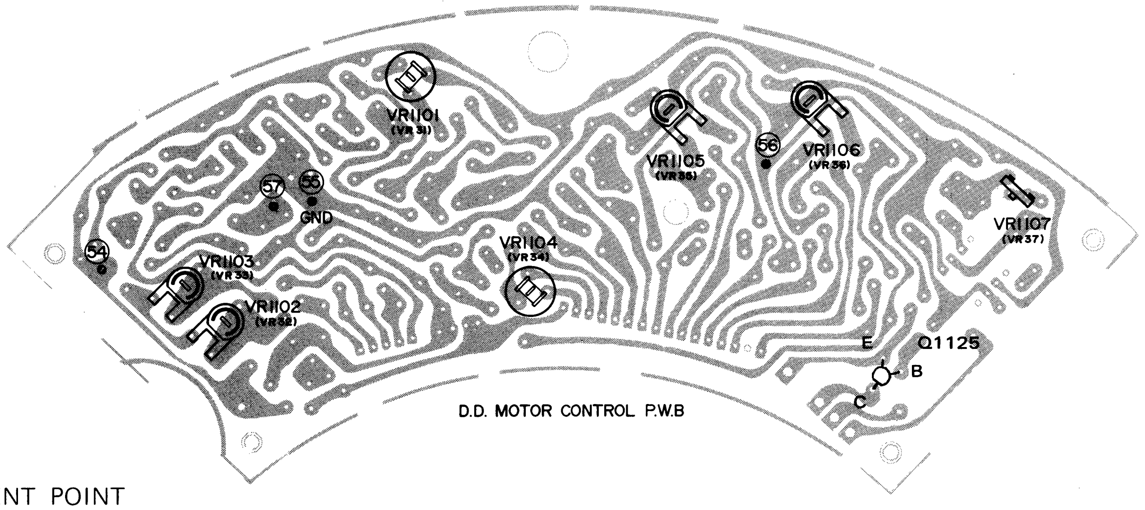

33
45
33 rpm
45 rpm
Turntable
Stroboscope

Figure 54–1


VR1101
(VR31)
VR1105
(VR35)
56
VR1106
(VR36)
57
55
GND
VR1107
(VR37)
54
VR1103
(VR33)
VR1104
(VR34)
VR1102
(VR32)
E
Q1125
B
C
D.D. MOTOR CONTROL P.W.B

ALIGNMENT POINT
VR1001 : Arm Return Sensor Adjust
VR1002 : Sensor Sensitivity Adjust
VR1101 : Frequency Multiple Adjust
VR1102 : 33-1/3 rpm Adjust
VR1103 : 45 rpm Adjust
VR1104 : Hall Device Adjust
VR1105, VR1106 : 4-Current Adjust
VR1107 : Stroboscope Frequency Adjust

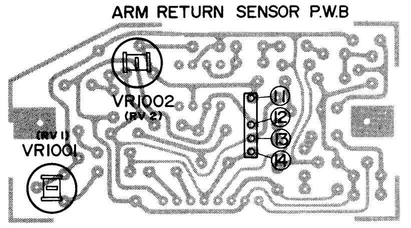

ARM RETURN SENSOR P.W.B
VR1002
(RV 2)
(RV 1)
VR1001
11
12
13
14

Figure 54–2 ALIGNMENT POINTS (PLAYER SECTION)

ALIGNMENT OF THE TAPE DECK SECTION

MECHANICAL ADJUSTMENT

■ TAKE-UP IDLER PRESSURE ADJUSTMENT

(Refer to Figure 55–1)

1. Set the unit in play mode.
2. Pull the point A with use of tension gauge (0 to 100 gr.) to make the take-up idler apart from the take-up turntable. Then, gradually release the tension gauge and read its value when the take-up turntable starts to rotate.
3. It is normal when the tension gauge reads 65 – 95 gr. If the above value is not satisfied, adjust the take-up idler pressure spring by bending it or replace.

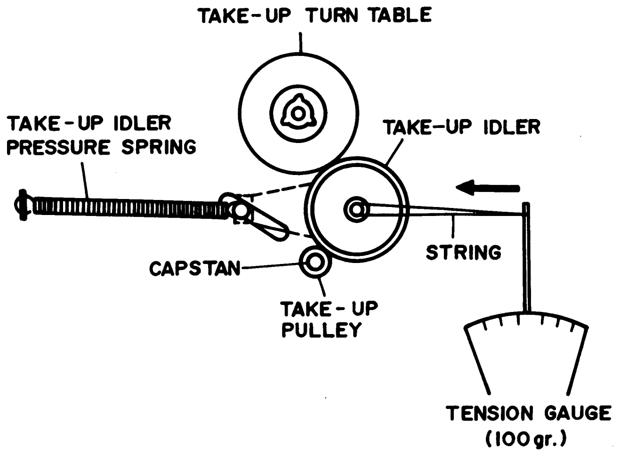

TAKE-UP TURN TABLE
TAKE-UP IDLER PRESSURE SPRING
TAKE-UP IDLER
CAPSTAN
STRING
TAKE-UP PULLEY
TENSION GAUGE (100gr.)

Figure 55–1

■ PRESSURE ROLLER PRESSURE ADJUSTMENT

(Refer to Figure 55–2)

1. Set the unit in play mode.
2. Push the point A with use of tension gauge (0 to 500 gr.) to make the pressure roller apart from the capstan shaft. Then, check that the tension gauge will reads 250 – 350 gr. when the pressure roller stops to rotate.
3. As a result of the check in the step 2 above, if the reading is found ouside the range of 250 – 350 gr., adjust the pressure spring of pressure roller by bending it or replace.

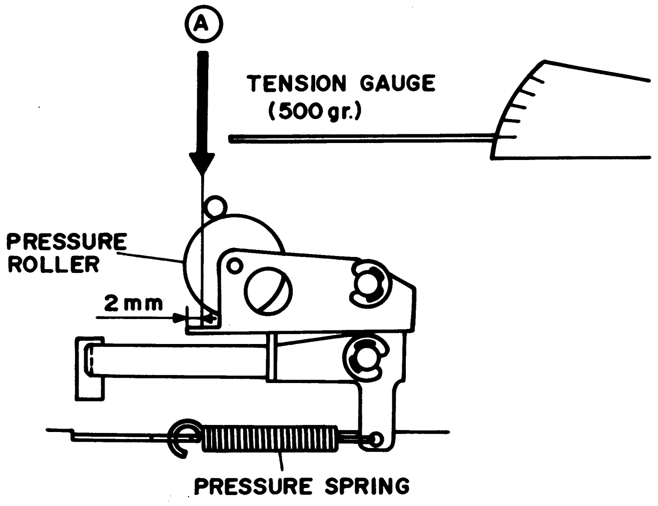

Ⓐ
TENSION GAUGE (500gr.)
PRESSURE ROLLER
2mm
PRESSURE SPRING

Figure 55–2

■ FLYWHEEL THRUST CLEARANCE ADJUSTMENT (Refer to Figure 55–3)

Slowly tighten the screw for flywheel thrust clearance until the thrust clearance becomes 0 (zero) and loosen the screw by 1/5 ~ 3/5 turn from this point. Since screw's pitch is 0.5 mm, thrust clearance of about 0.1 ~ 0.3 mm is produced.

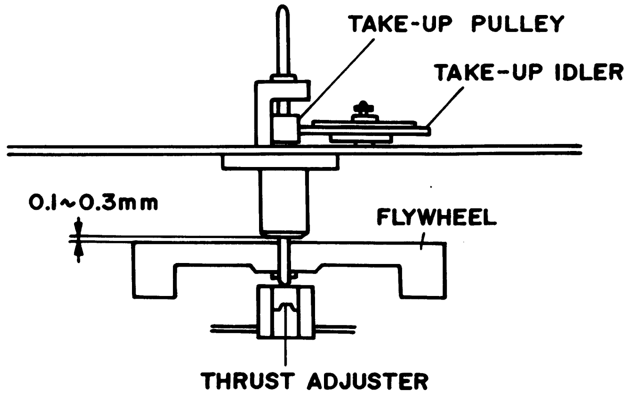

TAKE-UP PULLEY
TAKE-UP IDLER
0.1~0.3mm
FLYWHEEL
THRUST ADJUSTER

Figure 55–3

■ TORQUE CHECK

(Refer to Figure 56–1)

1. Set the torque measuring reel to the turntable (to the take-up side at playback or fast forward mode and to the supply side at rewind mode).
2. Then, rotate the reel in the same direction as for turntable and read the torque value when the pointer is stabilized.

Mode	Torque Value
Playback	30 – 60 gr. cm
Fast Forward	80 – 120 gr. cm
Rewind	80 – 120 gr. cm

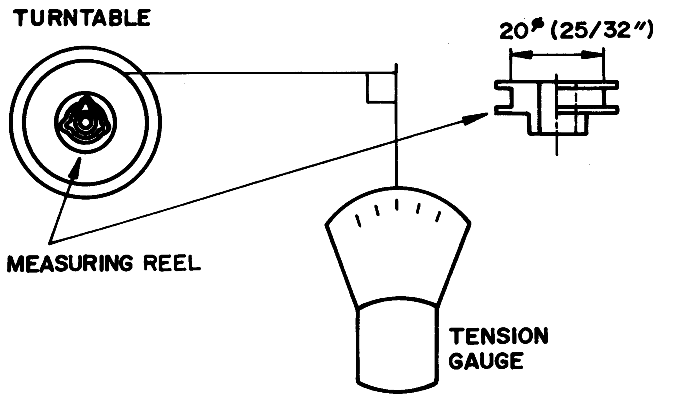

TURNTABLE
20ϕ (25/32")
MEASURING REEL
TENSION GAUGE

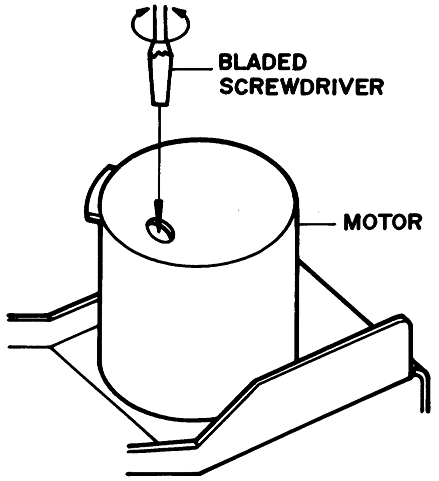
Figure 56–1

■ TAPE SPEED ADJUSTMENT

(Refer to Figure 56–2)

1. Connect an 4 ohm dummy resistor to the speakers socket (SO2 or SO3).
2. Connect a frequency counter across the 4 ohm resistor.
3. Use a test tape (MTT-111, 3 kHz) to be played back (at the midpoint but not at the running start or end point.)
4. Use a bladed screwdriver to adjust, through the adjusting hole at the bottom of motor, the semi-variable resistor so that the reproduced frequency becomes 2985 to 3015 Hz.

Note:
Before the adjustment, check that there is no stain nor other impurities on the motor pulley, drive belt, flywheel, take-up pulley, take-up idler and take-up turntable.


BLADED SCREWDRIVER
MOTOR

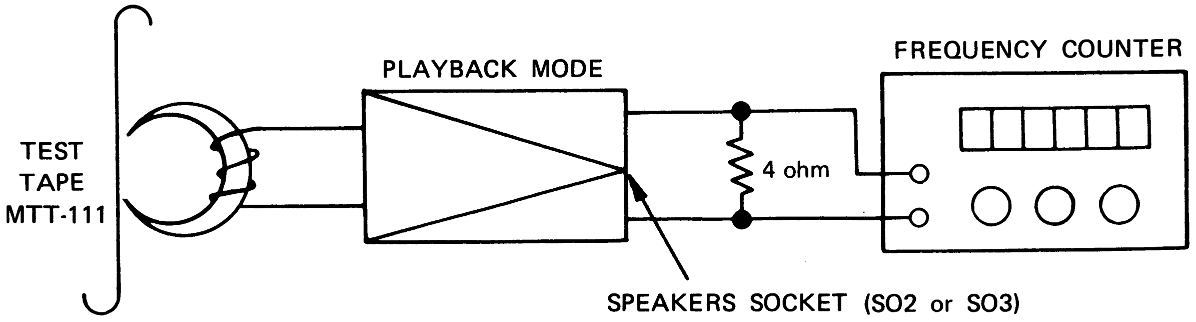

TEST TAPE MTT-111
PLAYBACK MODE
4 ohm
FREQUENCY COUNTER
SPEAKERS SOCKET (SO2 or SO3)

Figure 56–2

ELECTRICAL MEASUREMENT

* Set the FUNCTION switch to the TAPE position.

■ RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

(Refer to Figures 57–1 and 61–1)

1. Connect load resistor (4 ohm) to the speaker socket (SO2, SO3) and further connect the VTVM thereto.
2. Insert the test tape (MTT-114:10 kHz, –10 dB Recorded).
3. Set the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Set the unit in PLAYBACK mode.
6. Adjust the head azimuth adjusting screw so that the playback output voltage becomes maximum in both channels.

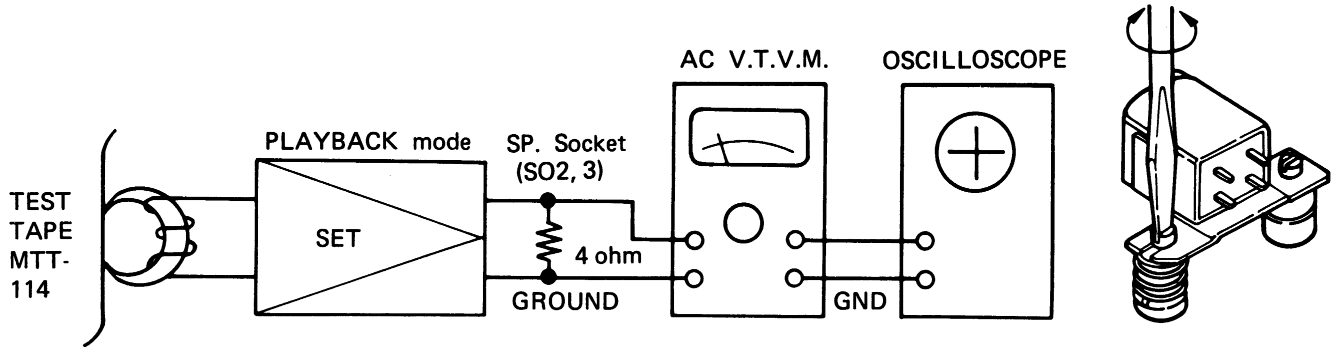

AC V.T.V.M.
OSCILLOSCOPE
PLAYBACK mode
SP. Socket
(SO2, 3)
TEST
TAPE
MTT-
114
SET
4 ohm
GROUND
GND

Figure 57–1

■ PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figures 57–2 and 61–1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (ground).
2. Insert the test tape (MTT-150, 400 Hz Recorded).
3. Set the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Set the unit in PLAYBACK mode.
6. Adjust the semi-variable resistor (VR501, VR502) so that the VTVM reads 580 mV.

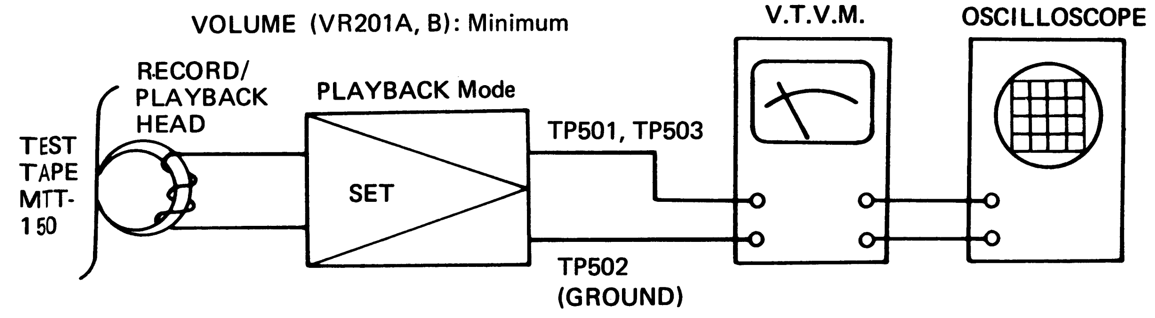

VOLUME (VR201A, B): Minimum
V.T.V.M.
OSCILLOSCOPE
RECORD/
PLAYBACK
HEAD
PLAYBACK Mode
TEST
TAPE
MTT-
150
SET
TP501, TP503
TP502
(GROUND)

Figure 57–2

■ LEVEL METER SENSITIVITY ADJUSTMENT

(Refer to Figures 58–1 and 61–1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (ground).
2. Insert the tape (non-recorded)
3. Set the function switch to the AUX/MIC position and the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (1 kHz, –16 dB) to the unit.
6. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the VTVM reads 580 mV.
7. Adjust the semi-variable resistor (VR505, VR506) so that the level meter indicates "0 VU".

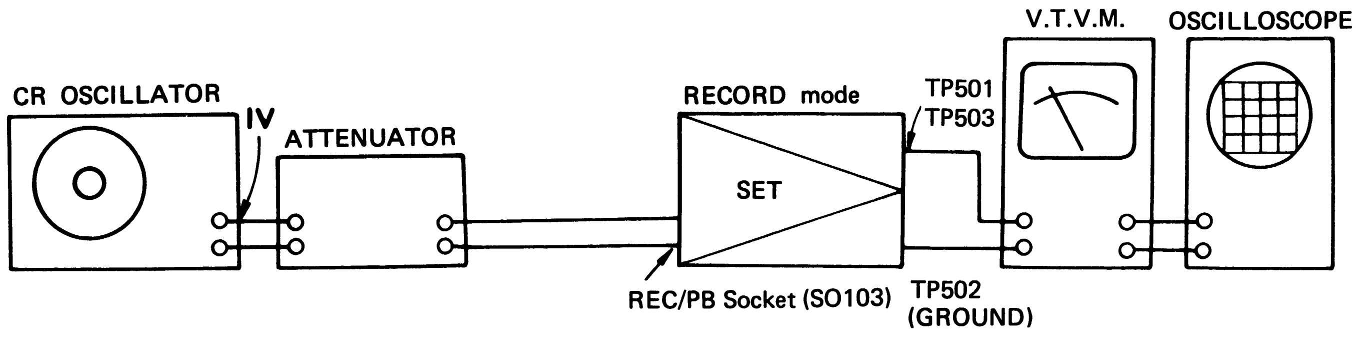

V.T.V.M.
OSCILLOSCOPE
CR OSCILLATOR
IV
ATTENUATOR
RECORD mode
TP501
/TP503
SET
REC/PB Socket (SO103)
TP502
(GROUND)

Figure 58–1

■ RECORD AMPLIFIER BIAS CURRENT ADJUSTMENT

(Refer to Figures 58–2 and 61–1)

1. Connect the VTVM across the 100 ohm resistor (R659, 660).
2. Insert the tape (non-recorded)
3. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
4. Set the unit in RECORD mode.
5. Adjust the semi-variable resistor (VR513, 514) so that the VTVM readings becomes 41 mV.

CHECK;
* BIAS switch (SW504)
EQ switch (SW503)
: CrO₂ position
——→ 49 – 59 mV
: Fe-Cr position
——→ 38 – 44 mV

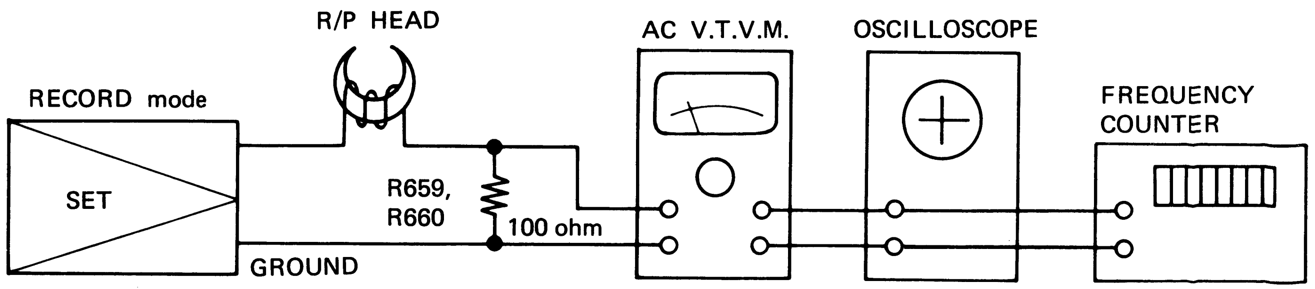

R/P HEAD
AC V.T.V.M.
OSCILLOSCOPE
RECORD mode
FREQUENCY
COUNTER
SET
R659,
R660
100 ohm
GROUND

Figure 58–2

■ ERASE CURRENT CHECK

(Refer to Figures 59–1 and 61–1)

1. Connect the VTVM across the 1 ohm resistor (R661)
2. Insert the tape (non-recorded).
3. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
4. Set the unit in RECORD mode.
5. Make sure the erase current is 60 ~ 120 mV.
   * BIAS switch (SW504) } CrO₂ position
     EQ switch (SW503)
     ⟶90 ~ 150 mV
6. Make sure the record oscillator bias frequency is 84 ± 5 kHz.

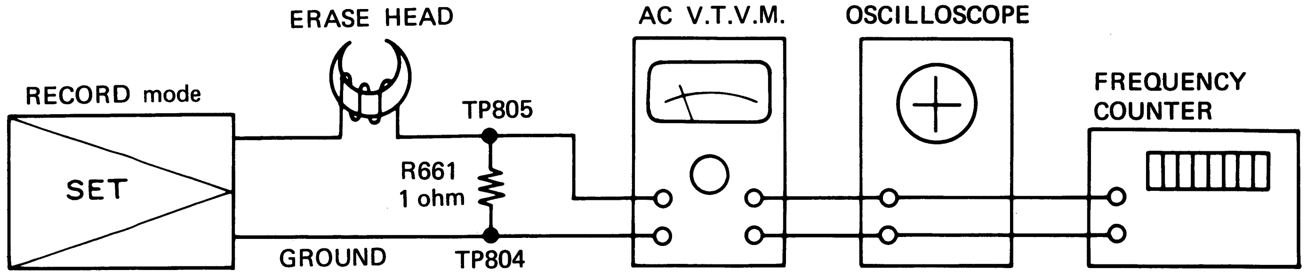
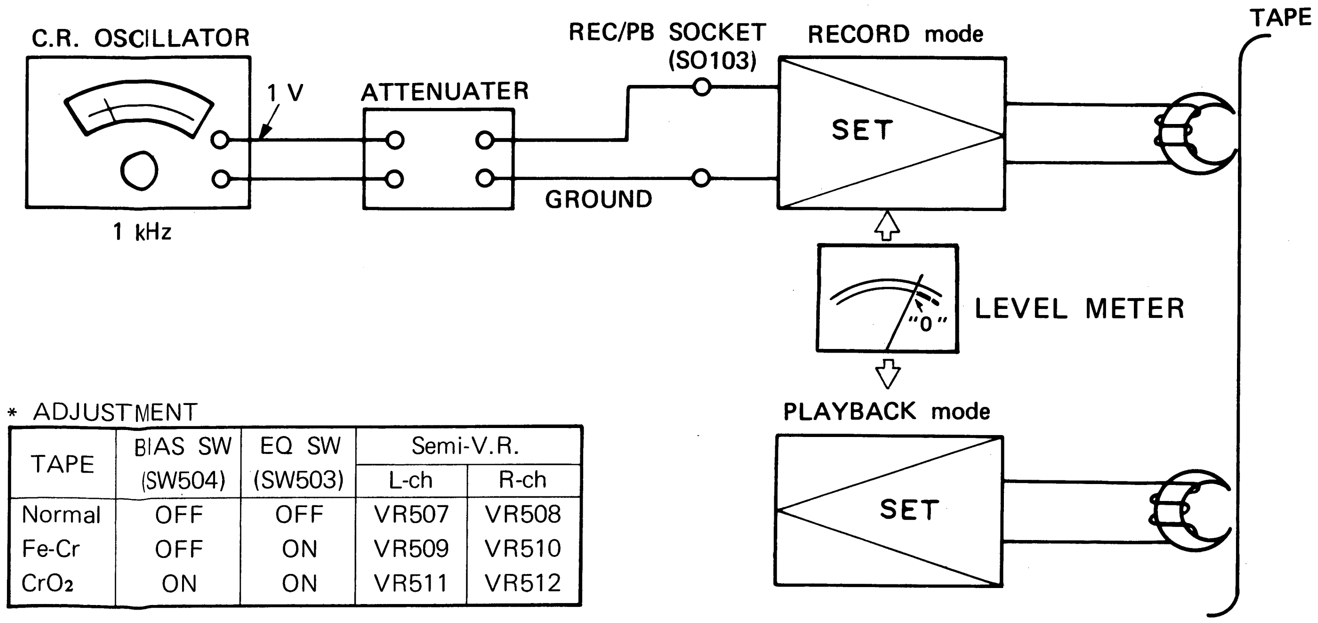

ERASE HEAD
RECORD mode
SET
TP805
R661
1 ohm
GROUND
TP804
AC V.T.V.M.
OSCILLOSCOPE
FREQUENCY
COUNTER

Figure 59–1

■ RECORD AND PLAYBACK SENSITIVITY ADJUSTMENT

(Refer to Figures 59–2 and 61–1)

1. Insert the tape (non-recorded), and set the function switch to the AUX/MIC position.
2. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (1 kHz, –16 dB) to the unit.
3. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the LEVEL meter indicates "0 VU".
4. Reproduce the tape which has been recorded at the step 2 above.
5. Adjust the * semi-variable resistor (VR507 ~ VR512) so that the LEVEL meter indicates "0 VU". (within ± 0.5 VU)


C.R. OSCILLATOR
1 kHz
1 V
ATTENUATER
REC/PB SOCKET
(SO103)
GROUND
RECORD mode
SET
TAPE
"0"
LEVEL METER
PLAYBACK mode
SET

* ADJUSTMENT

TAPE	BIAS SW (SW504)	EQ SW (SW503)	Semi-V.R.	
			L-ch	R-ch
Normal	OFF	OFF	VR507	VR508
Fe-Cr	OFF	ON	VR509	VR510
CrO₂	ON	ON	VR511	VR512

Figure 59–2

■ DOLBY NOISE REDUCTION CHECK

(Refer to Figures 60–1 and 61–1)

1. Connect the VTVM to the test point TP501 (TP503) and test point TP502 (GROUND).
2. Insert the tape (non-recorded)
3. Set the function switch to the AUX/MIC position and the Dolby N.R. switch (SW506) to the OFF position.
4. Set the BIAS switch (SW504) and EQ switch (SW503) to the NORMAL position.
5. Connect the C.R. oscillator to the REC/PB socket (SO103) and apply signals (100 Hz, –35 dB) to the unit.
6. Set the unit in RECORD mode, and adjust the REC LEVEL control (VR503, VR504) so that the VTVM reads 32.6 mV.
7. Set the Dolby N.R. switch (SW506) to the ON position and apply signals (1 kHz) to the unit. If the indication of the VTVM is 43 ~ 85 mV at that time, this means that the Dolby Noise Reduction is normal.

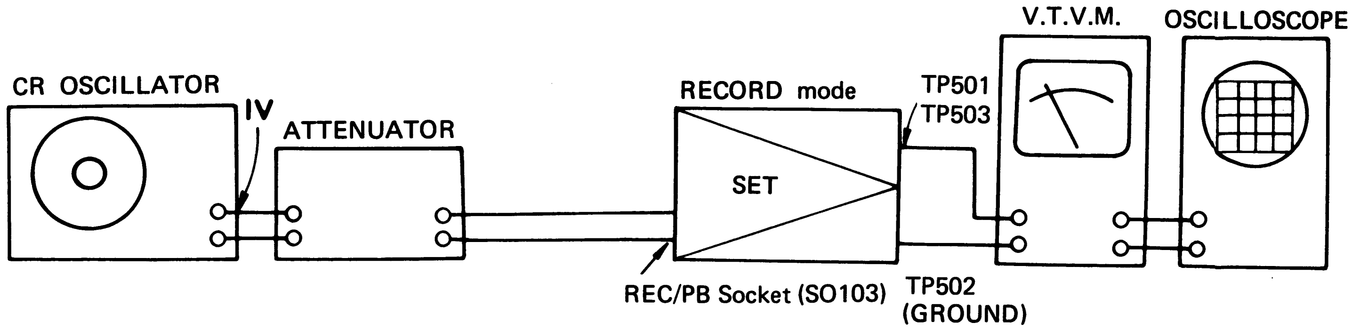

CR OSCILLATOR
IV
ATTENUATOR
RECORD mode
SET
TP501
/TP503
V.T.V.M.
OSCILLOSCOPE
REC/PB Socket (SO103)
TP502
(GROUND)

Figure 60–1

NOTE: For the measurement of playback frequency response, use the standard test tape below:

EQ switch	TYPE NUMBER
NORMAL	MTT-117E, MTT-217G, MTT-217E, MTT-216
CrO₂, Fe-Cr	MTT-117SP, MTT-316

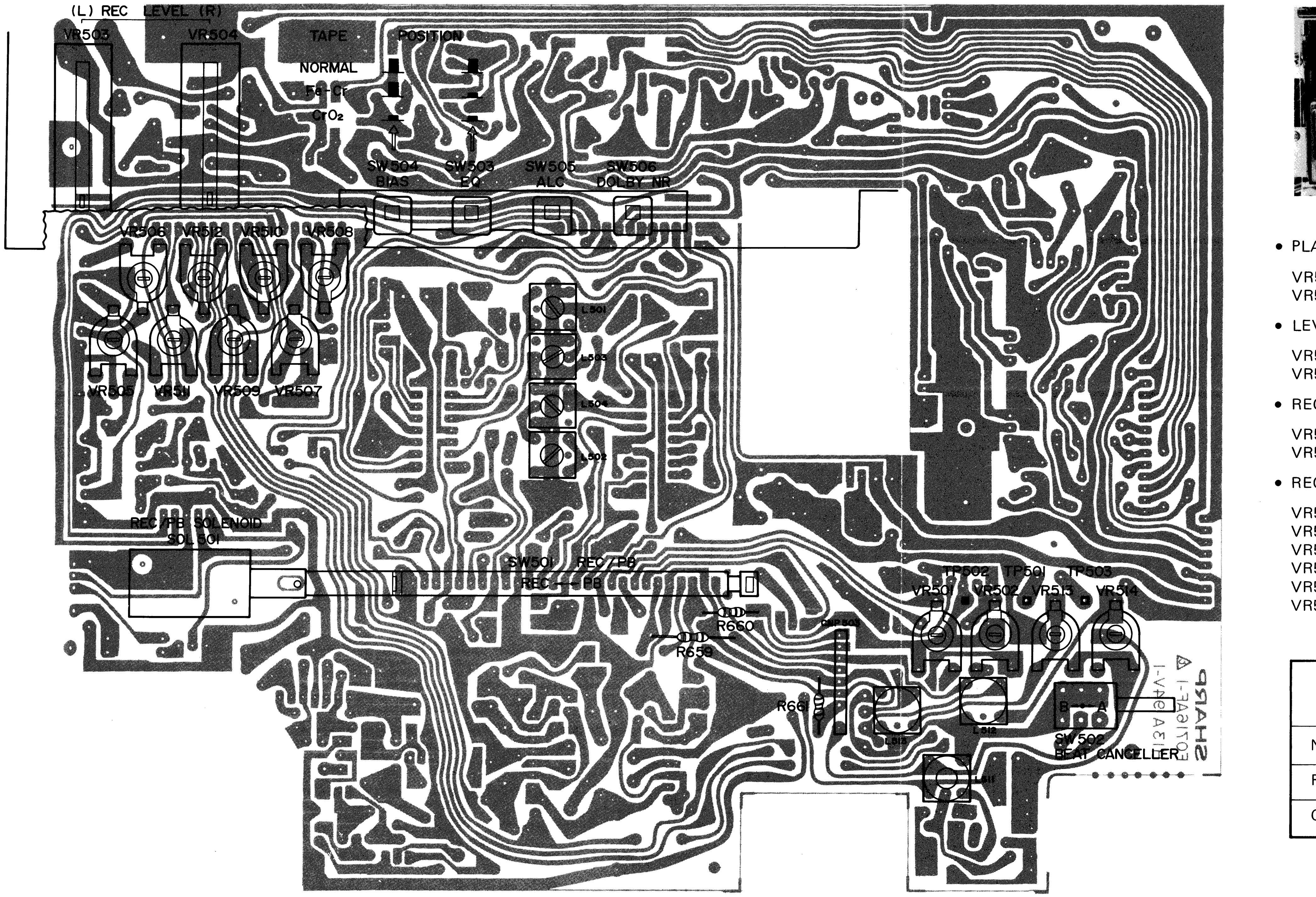
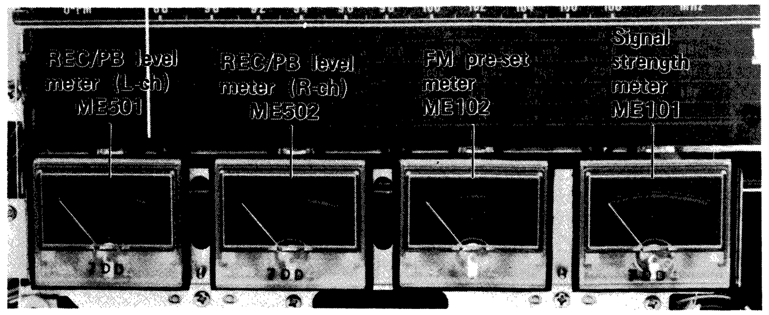

(L) REC LEVEL (R)
VR503
VR504
TAPE POSITION
NORMAL
Fe-Cr
CrO₂
SW504 BIAS
SW503 EQ
SW505 ALC
SW506 DOLBY NR
VR506
VR512
VR510
VR508
VR505
VR511
VR509
VR507
L501
L503
L504
L502
REC/PB SOLENOID SOL 501
SW501 REC/PB
REC — PB
R660
R659
R661
TP502
TP501
TP503
VR501
VR502
VR513
VR514
L512
L513
L511
B — A
SW502 BEAT CANCELLER
SHARP

Figure 61–1 ALIGNMENT POINTS (TAPE DECK SECTION)


REC/PB level meter (L-ch) ME501
REC/PB level meter (R-ch) ME502
FM pre-set meter ME102
Signal strength meter ME101

- PLAYBACK SENSITIVITY ADJUSTMENT

VR501, VR502 } :Playback sensitivity adjust

- LEVEL METER SENSITIVITY ADJUSTMENT

VR505, VR506 } :Level meter sensitivity adjust

- RECORD AMPLIFIER BIAS CURRENT ADJUSTMENT

VR513, VR514 } :Bias adjust

- RECORD AND PLAYBACK SENSITIVITY ADJUSTMENT

VR507, VR508, VR509, VR510, VR511, VR512 } :Overall sensitivity adjust

TAPE	POSITION		Semi-VR	
	BIAS SW SW504	EQ SW SW503	L-ch	R-ch
Normal	▮	▮	VR507	VR508
Fe-Cr	▮	▬	VR509	VR510
CrO₂	▬	▬	VR511	VR512

- AM IF ALIGNMENT POINT

T103 :AM I.F.T. (H;455 kHz, E;465 kHz)
T104 :AM IF trap filter

- AM RF ALIGNMENT POINT

SW
L106 :SW antenna coil
L111 :SW oscillation coil
TC101 :SW antenna trimmer
TC104 :SW oscillation trimmer
MW
L108 :MW antenna coil
L112 :MW oscillation coil
TC102 :MW antenna trimmer
TC105 :MW oscillation trimmer
LW
L109 :LW antenna coil
L113 :LW oscillation coil
TC103 :LW antenna trimmer
TC106 :LW oscillation trimmer

- FM IF ALIGNMENT

IFT :I.F.T. (Front end)
T101 :FM quadrature
T102 :FM quadrature

- FM RF ALIGNMENT

LA :FM antenna coil
LR :FM RF coil
LO :FM oscillation coil
TCA :FM antenna trimmer
TCR :FM RF trimmer
TCO :FM oscillation trimmer
(Front end)
VR103 :FM low frequency adjust
VR106 :FM high frequency adjust

- FM MPX ALIGNMENT

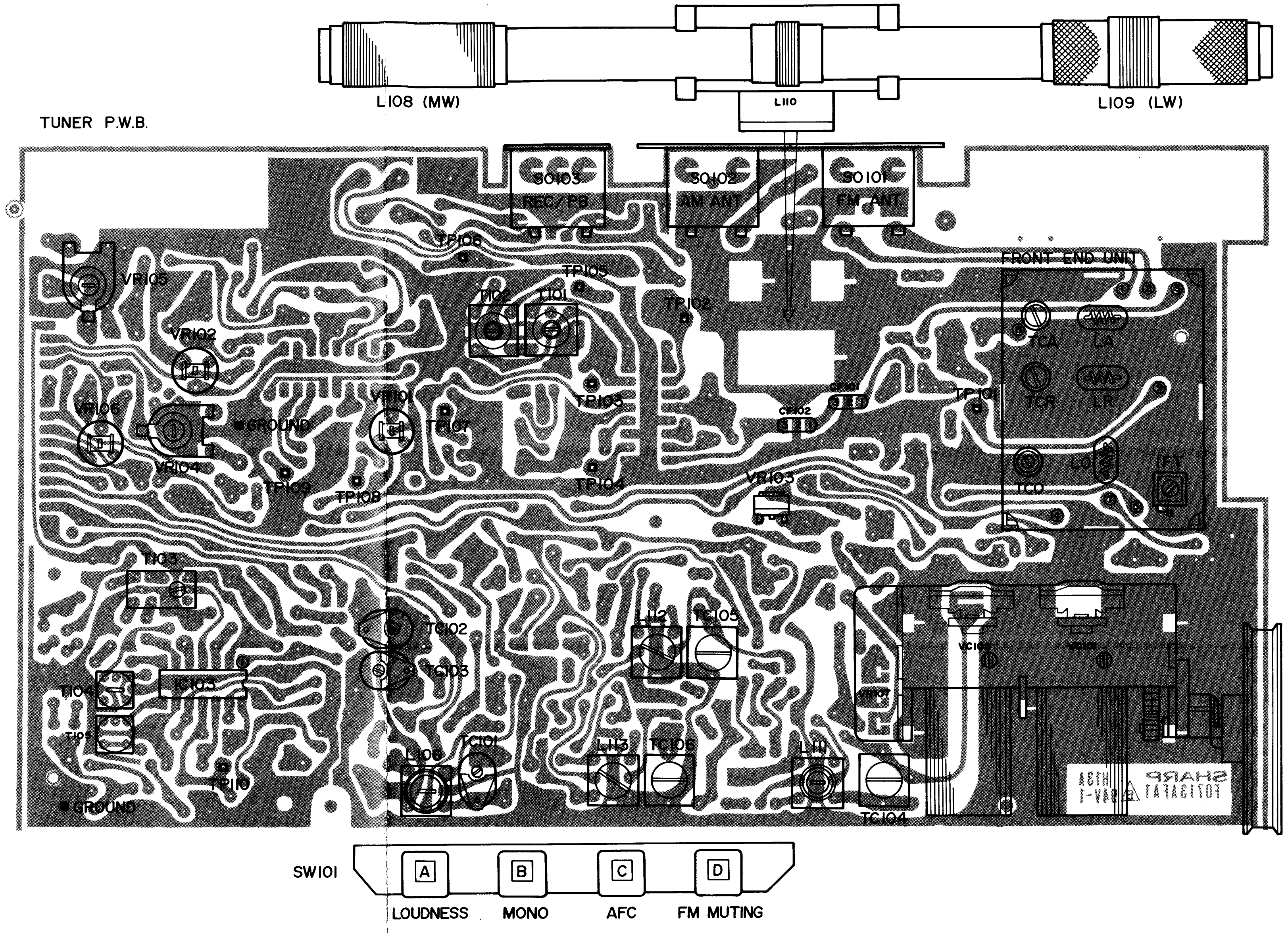
VR101 :FM V.C.O. adjust
VR102 :FM stereo separation adjust

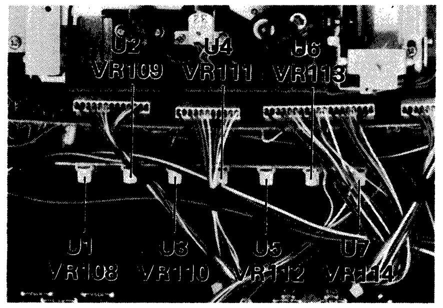
- FM PRE-SET METER ADJUSTMENT

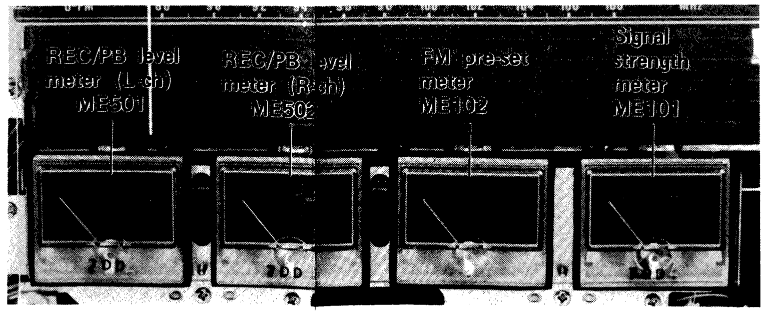
VR104, VR105 :FM pre-set meter adjust
VR108 :U1
VR109 :U2
VR110 :U3
VR111 :U4
VR112 :U5
VR113 :U6
VR114 :U7
FM pre-set tuning

- FM MUTING ADJUSTMENT

VR801 :FM pre-set muting adjust


L108 (MW)
L110
L109 (LW)
TUNER P.W.B.
SO103 REC/PB
SO102 AM ANT
SO101 FM ANT
FRONT END UNIT
TCA
LA
TCR
LR
LO
TCO
IFT
VR105
VR102
VR106
VR104
GROUND
VR101
TP106
TP105
TP102
T102
T101
TP103
TP107
TP109
TP108
TP104
CF101
CF102
TP101
VR103
T103
TC102
TC103
L112
TC105
VC102
VC101
VR107
T104
T105
IC103
TP110
GROUND
L106
TC101
L113
TC106
L111
TC104
SHARP
SW101
A
B
C
D
LOUDNESS
MONO
AFC
FM MUTING


U2
VR109
U4
VR111
U6
VR113
U1
VR108
U3
VR110
U5
VR112
U7
VR114


REC/PB level meter (L-ch) ME501
REC/PB level meter (R-ch) ME502
FM pre-set meter ME102
Signal strength meter ME101

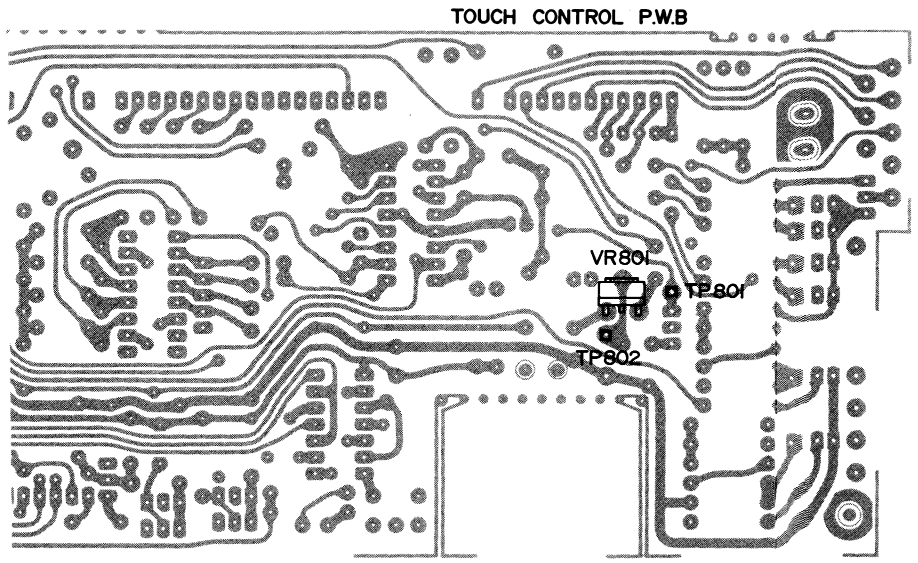

TOUCH CONTROL P.W.B
VR801
TP801
TP802

Figure 63–1 ALIGNMENT POINTS (TUNER SECTION)

ALIGNMENT OF THE TUNER SECTION

Alignment is an exacting procedure and should be undertaken only when necessary.
If alignment of AM and FM is required, either section may be done first.

Note : Use a non-metallic alignment tool.

REQUIRED EQUIPMENT:

1. Signal generator with a frequency range of 140 kHz to 18.5 MHz: AM
2. Signal generator with a frequency range of 87.4 MHz to 109 MHz: FM
3. Signal generator with a frequency output of 10.7 MHz ± 0.5 MHz: FM
4. Vacuum tube voltmeter (AC-VTVM)
5. Sweep signal generator with a sweep range of at least 500 kHz and center frequency of 10.7 MHz with at least a 10.7 MHz marker. (Ext. Marker may be used.)
6. Oscilloscope with a wide range amplifier of approximately 100 kHz.
7. Test loops, a coil of any size wire, one turn or more.
8. FM stereo signal generator.
9. Audio signal generator with a frequency of 20 Hz to 100 kHz.
10. Frequency counter.

The FM stereo section, however, should be done only if the FM monaural section is properly adjusted.

Notes: Allow the set at least five minutes to warm up before attempting alignment. During alignment keep the signal generator output at the lowest level that will maintain a usable output from the set, except for FM stereo signal generator. Take much care, lest the grounding of FM sweep signal generator input should make multipaths which made FM IF alignment incorrect. To avoid this the grounding lead may be connected through 0.01 – 0.04 MFD capacitor to the tuner chassis when sweep generator is connected to the tuner section.

Generator modulation (AM) . . . 30%, 400 Hz
Generator modulation (FM) . . . 40 kHz, 400 Hz
Generator modulation . . . . CH.L. or CH.R.
(FM stereo) 40 kHz, 1000 Hz Mod.

THE INSTRUCTION OF FREQUENCY ADJUSTMENT

In order to comply with FTZ rule Nr. 358/1970, please fix the low end of dial frequency (87.5 MHz) and the high end of dial frequency (108 MHz) on FM band, by adjusting fL variable resistor (VR103) and fH variable resistor (VR106) respectively, as illustrated in Figure

ALIGNMENT CHART

AM IF ALIGNMENT (Refer to Figures 63–1 and 65–1)

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	SCOPE CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	MW	IF	Through 0.01μF to IC103 (1 Pin) as small as possible	455kHz (Sweep)	High end of Dial	Oscilloscope connected to TP110 and ground.	Adjust T103 to obtain maximum response, at 455 kHz. Next, adjust T104 to obtain minimum response at 455kHz	Repeat 2 or 3 times.

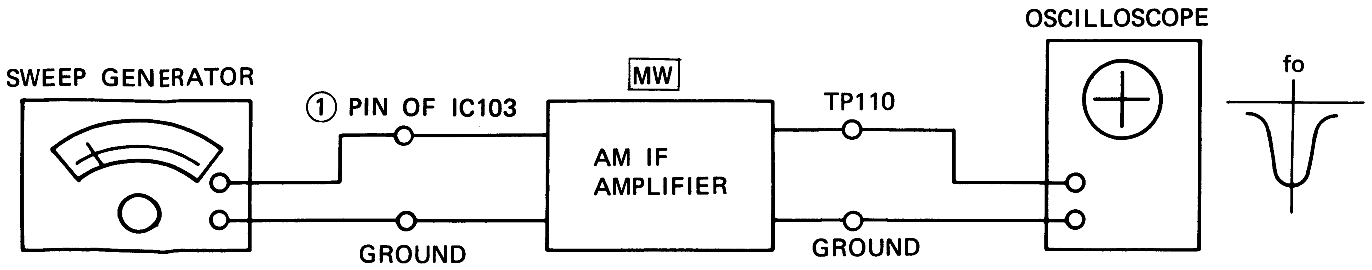


Figure 65–1 AM IF ALIGNMENT EQUIPMENT CONNECTIONS

AM RF ALIGNMENT (Refer to Figures 63–1 and 66–1)

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	SW	Band Coverage	Through IEC dummy to AM EXT ANT. as small as possible	5.7MHz Modulated	Low end of Dial	Same as above	Oscillation coil L111	
2	SW		Same as above	18.3MHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC104	
3	SW	Tracking	Same as above	6.5MHz Modulated	6.5MHz	Same as above	Antenna coil L106	
4	SW		Same as above	16MHz Modulated	16MHz	Same as above	Antenna Trimmer TC101	
5	MW	Band Coverage	Radiated Signal as small as possible	515kHz Modulated	Low end of Dial	Same as above	Oscillation coil L112	
6	MW		Radiated Signal as small as possible	1650kHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC105	
7	MW	Tracking	Radiated Signal as small as possible	600kHz Modulated	600kHz	Same as above	Antenna coil L108	
8	MW		Radiated Signal as small as possible	1400kHz Modulated	1400kHz	Same as above	Antenna Trimmer TC102	
9	LW	Band Coverage	Radiated Signal as small as possible	145kHz Modulated	Low end of Dial	VTVM connected to TP109 and ground	Oscillation coil L113	Adjust for maximum output Repeat 2 or 3 times.
10	LW		Radiated Signal as small as possible	385kHz Modulated	High end of Dial	Same as above	Oscillation Trimmer TC106	
11	LW	Tracking	Radiated Signal as small as possible	170kHz Modulated	170kHz	Same as above	Antenna coil L109	
12	LW		Radiated Signal as small as possible	340kHz Modulated	340kHz	Same as above	Antenna Trimmer TC103	

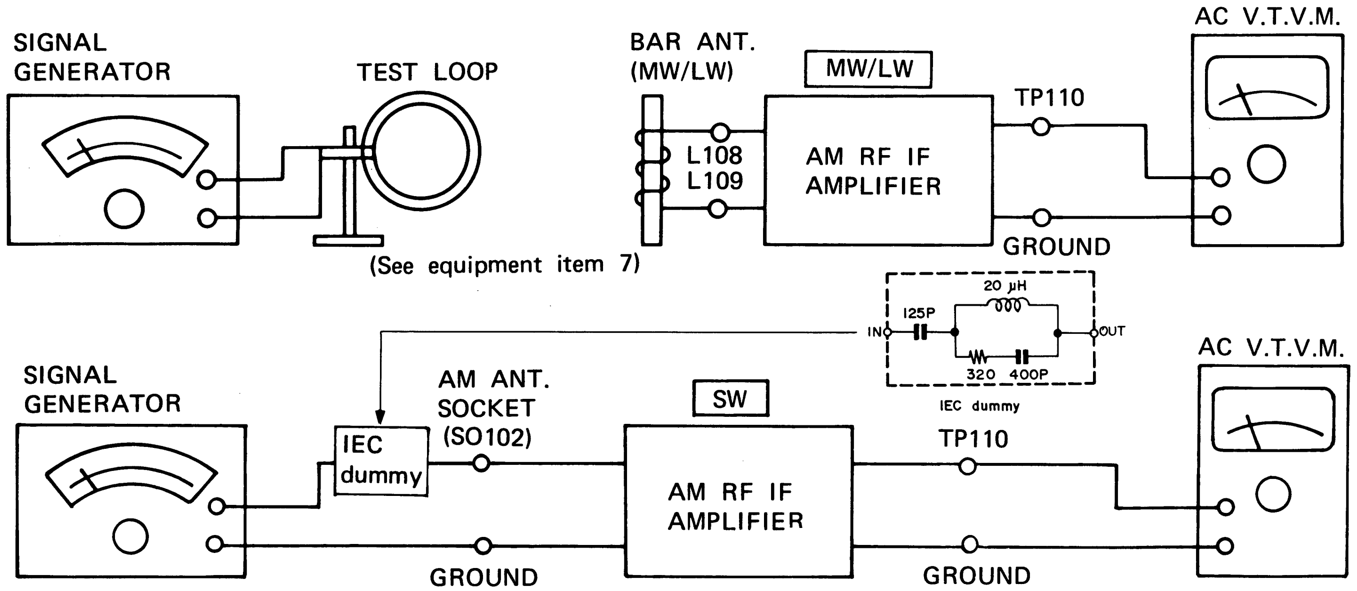
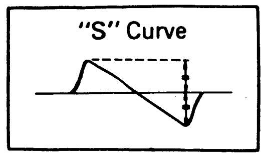


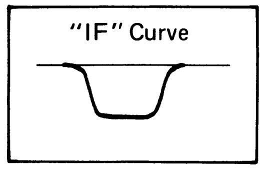
Figure 66–1 AM RF ALIGNMENT EQUIPMENT CONNECTIONS

FM IF ALIGNMENT (Refer to Figures 63–1 and 67–1)

AFC/MUTING switch (SW101C, D) : OFF

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER SCOPE CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	FM	IF (See NOTE A)	Through 1.5pF to TP101 and ground.	10.7MHz ±500kHz as small as possible	High end of Dial	Oscilloscope connected to test point TP104 and ground.	IFT FM TUNER Front end	Adjust "IF" curve at maximum as shown in the figure 67–1
2	FM		Same as above	No signal	Same as above	VTVM connected to test point TP102 (+) and TP105 (–)	T101	Adjust the 0V to lead of VTVM
3	FM		Same as above	Same as step 1	Same as above	Oscilloscope connected to test point TP106	T102	Adjust for best "S" curve





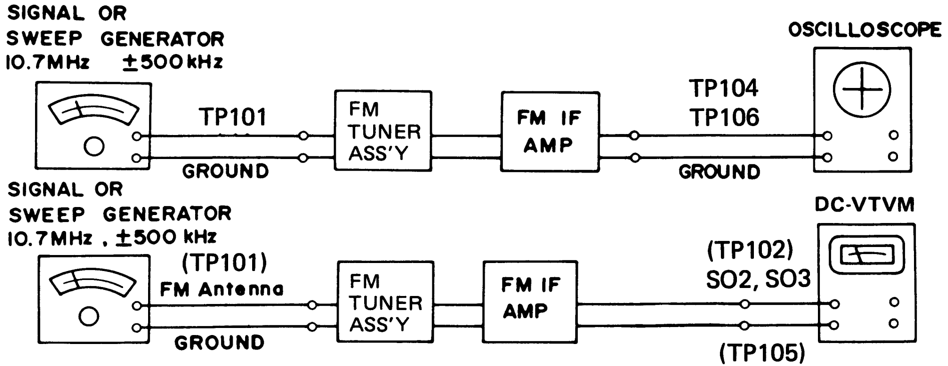

SIGNAL OR
SWEEP GENERATOR
10.7MHz ±500kHz
TP101
GROUND
FM TUNER ASS'Y
FM IF AMP
TP104
TP106
GROUND
OSCILLOSCOPE
SIGNAL OR
SWEEP GENERATOR
10.7MHz , ±500 kHz
(TP101)
FM Antenna
GROUND
FM TUNER ASS'Y
FM IF AMP
(TP102)
SO2, SO3
(TP105)
DC-VTVM

Figure 67–1 FM ALIGNMENT EQUIPMENT CONNECTIONS

FM RF ALIGNMENT (Refer to Figures 63–1 and 67–1)

AFC/MUTING switch (SW101C, D) : OFF
Pre-set Control button : MANUAL

STEP	BAND	TEST STAGE	SIGNAL GENERATOR		DIAL POINTER SETTING	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	FREQUENCY				
1	FM	Band coverage	FM Antenna	87MHz as small as possible (Modulated)	Low end of Dial	DC-VTVM connected to 8 pin of FM FRONT END	VR103	Adjust the 2.87V to 8 pin of FM Tuner Front end
2			Same as above	109MHz as small as possible (Modulated)	High end of Dial	Same as above	VR106	Adjust the 24.24V to 8 pin of FM Tuner Front end. Repeat steps 1 and 2 until no further improvement can be made
* 3			Same as above	87MHz as small as possible (Modulated)	Low end of Dial	VTVM Connection to SO2 or SO3	Oscillation coil LO	Adjust for maximum output
* 4			Same as above	109MHz as small as possible (Modulated)	High end of Dial	Same as above	Oscillation trimmer TCO	Same as above. Repeat steps 3 and 4 until no further improvement can be made
* 5	FM	Tracking	Same as above	90MHz as small as possible (Modualted)	90MHz	Same as above	Antenna coil L_A and RF coil L_R	Adjust for maximum output
* 6			Same as above	106MHz as small as possible (Modulated)	106MHz	Same as above	Antenna trimmer TC_A and RF trimmer TC_R	Same as above 5~6 Repeat 2 or 3 Times

(*) As for FM high-frequency range (front-end section), since it has been already adjusted, do not rotate the coils and trimmers unless the adjustment becomes necessary – readjust the FM-high frequency only when it suffers a considerable disalignement.

FM MPX ALIGNMENT (Refer to Figures 63–1 and 68–1)

STEP	BAND	TEST STAGE	STEREO SIGNAL GENERATOR		TUNING FREQUENCY	METER CONNECTION	ADJUSTMENT	REMARKS
			CONNECTION	MOD FREQUENCY				
1	FM	V.C.O.	FM-ANT. Terminal	98MHz Modulated	98MHz	VTVM connected to TP109 and ground	VR101	Adjust for 19 ±0.1kHz
2	FM	STEREO SEPARATION	FM-ANT. Terminal	98MHz stereo Mod. (1000Hz) L-ch only	98MHz	VTVM connected to L-ch SP. socket	Volume control (VR201A, B)	Adjust the VTVM reads 1.4V (0dB)
3			Same as above	Same as above	Same as above	VTVM connected to R-ch SP. socket	VR102	Adjust for minimum output

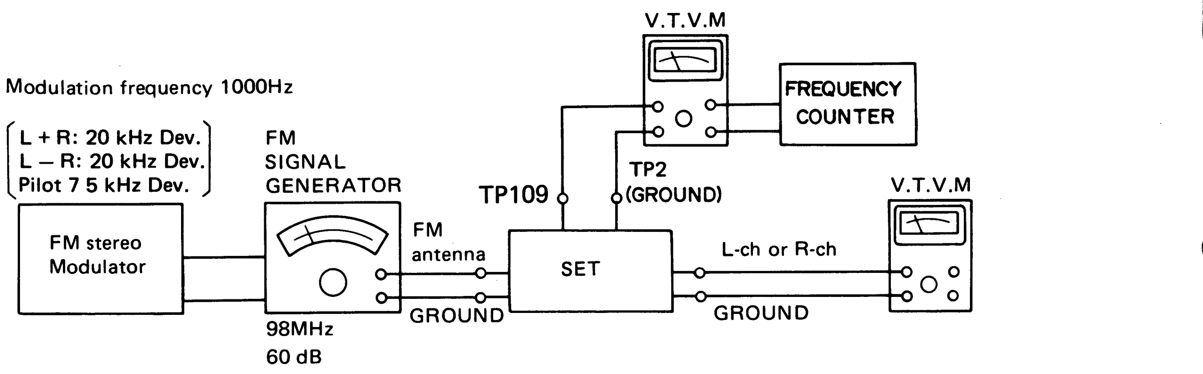
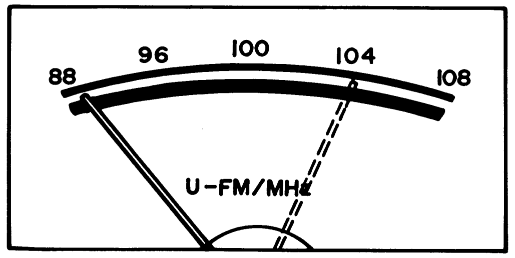

V.T.V.M
FREQUENCY COUNTER
Modulation frequency 1000Hz
L + R: 20 kHz Dev.
L – R: 20 kHz Dev.
Pilot 7 5 kHz Dev.
FM SIGNAL GENERATOR
TP109
TP2 (GROUND)
V.T.V.M
FM stereo Modulator
FM antenna
SET
L-ch or R-ch
GROUND
GROUND
98MHz
60 dB

Figure 68–1 FM STEREO ALIGNMENT EQUIPMENT CONNECTIONS

■ FM PRESET METER ADJUSTMENT

(Refer to Figures 63–1 and 68–2)

1. Set the function switch (SW1) to "U-FM" position.
2. Connect the FM signal generator to the FM antenna terminal of the unit. (The FM signal generator is kept to "88 MHz".)
3. Rotate the U1 preset knob of the unit to tune in 88 MHz signal.
4. Adjust the semi-variable resistor VR105 so that the FM preset meter ME102 will indicate "88 MHz".
5. Have the FM signal generator produce 104 MHz signal.
6. Rotate the U2 preset knob of the unit to tune in 104 MHz signal.
7. Adjust the semi-variable resistor VR104 so that the FM preset meter ME102 will indicate "104 MHz".
8. Repeat two or three times the procedures 2 to 7 stated above.


88
96
100
104
108
U-FM/MHz

FM PRE-SET METER (ME 102)

Figure 68–2

■ FM MUTING ADJUSTMENT

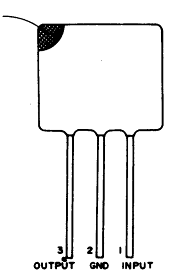
(Refer to Figure 63–1)

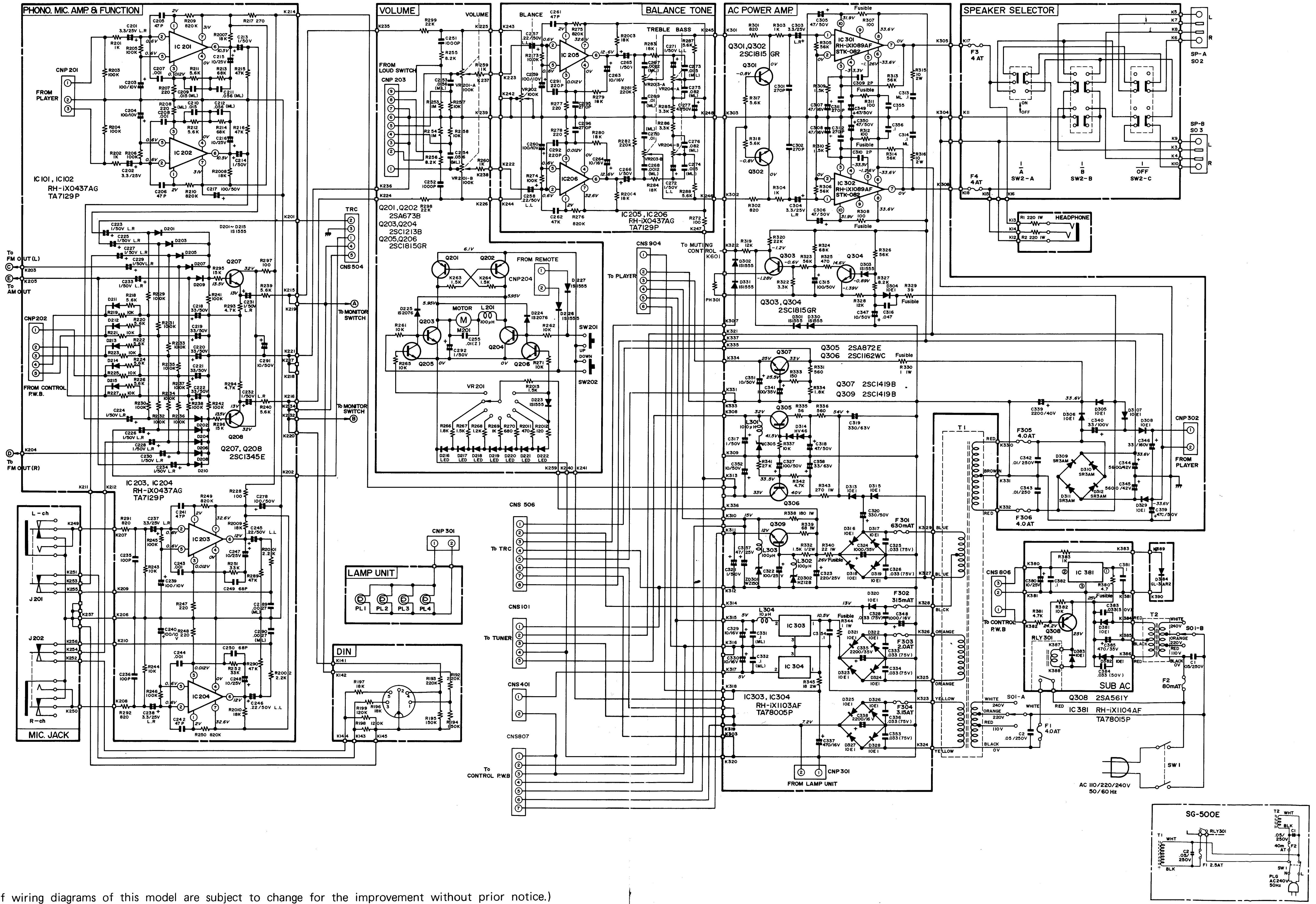
1. Connect the DC VTVM to TP802 and ground.
2. Adjust the semi-variable resistor (VR801) so that the DC VTVM reads 3.8 V.

NOTE A

Five kinds of ceramic filter (CF101, CF102) are available for this set. The difference of central frequency from each other can be known by the color indication. The table below shows such a difference of IF and S curve, depending upon the color indications of the ceramic filter (CF101, CF102).

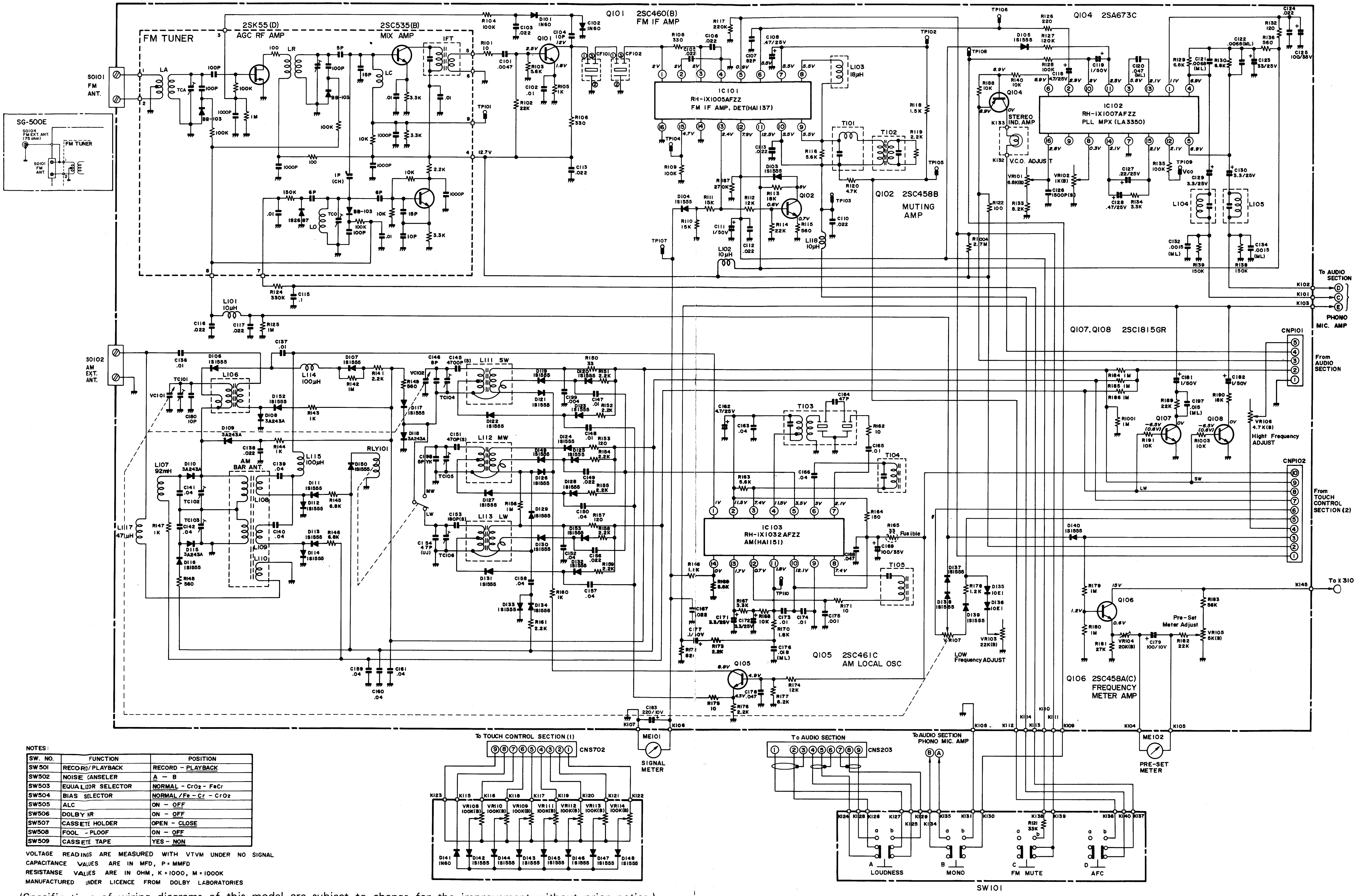
Central Frequency	D	Black	10.64MHz ± 30kHz
	B	Blue	10.67MHz ± 30kHz
	A	Red	10.70MHz ± 30kHz
	C	Orange	10.73MHz ± 30kHz
	E	White	10.76MHz ± 30kHz


COLOR MARK
3
2
1
OUTPUT
GND
INPUT


PHONO. MIC. AMP. & FUNCTION
VOLUME
BALANCE TONE
AC POWER AMP.
SPEAKER SELECTOR
IC101, IC102
RH-iX0437AG
TA7129P
IC201
IC202
IC203, IC204
RH-iX0437AG
TA7129P
IC205, IC206
RH-iX0437AG
TA7129P
Q201, Q202 2SA673B
Q203, Q204 2SC1213B
Q205, Q206 2SC1815GR
Q207, Q208 2SC1345E
Q301, Q302 2SC1815GR
Q303, Q304 2SC1815GR
Q305 2SA872E
Q306 2SC1162WC
Q307 2SC1419B
Q309 2SC1419B
IC301
IC302
RH-iX1089AF
STK-082
IC303, IC304
RH-iX1103AF
TA78005P
IC381
Q308 2SA561Y
IC381 RH-iX1104AF
TA78015P
SUB AC
CNP201
FROM PLAYER
CNP202
FROM CONTROL P.W.B.
To FM OUT(L)
To AM OUT
To FM OUT(R)
TRC
CNS504
To MONITOR SWITCH
CNP203
FROM LOUD SWITCH
FROM REMOTE
CNP204
MOTOR
SW201
SW202
UP
DOWN
VR201
LAMP UNIT
PL1
PL2
PL3
PL4
CNP301
DIN
MIC. JACK
L-ch
R-ch
J201
J202
CNS506
To TRC
CNS101
To TUNER
CNS401
CNS807
To CONTROL P.W.B.
CNS904
To PLAYER
To MUTING CONTROL
T1
T2
F1 4.0AT
F2 80mAT
F3 4AT
F4 4AT
F301 630mAT
F302 315mAT
F303 2.0AT
F304 3.15AT
F305 4.0AT
F306 4.0AT
SP-A SO2
SP-B SO3
L
R
SW2-A
SW2-B
SW2-C
A
B
OFF
HEADPHONE
CNP302
FROM PLAYER
CNS806
To CONTROL P.W.B.
RLY301
SO1-A
SO1-B
SW1
AC 110/220/240V 50/60Hz
FROM LAMP UNIT
SG-500E

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 69–1 SCHEMATIC DIAGRAM (Audio Section)


FM TUNER
2SK55(D) AGC RF AMP
2SC535(B) MIX AMP
IFT
Q101 2SC460(B) FM IF AMP
IC101 RH-IX1005AFZZ FM IF AMP, DET(HA1137)
Q102 2SC458B MUTING AMP
Q104 2SA673C
STEREO IND. AMP
IC102 RH-IX1007AFZZ PLL MPX (LA3350)
V.C.O. ADJUST
To AUDIO SECTION
PHONO MIC. AMP
Q107, Q108 2SC1815GR
CNP101
From AUDIO SECTION
Hight Frequency ADJUST
CNP102
From TOUCH CONTROL SECTION (2)
To K310
SG-500E
S0101 FM ANT.
S0102 AM EXT. ANT.
S0104 FM EXT. ANT. (75 ohm)
L106
AM BAR ANT.
RLY101
L111 SW
L112 MW
L113 LW
T103
T104
T105
IC103 RH-IX1032AFZZ AM(HA1151)
Q105 2SC461C AM LOCAL OSC
LOW Frequency ADJUST
Q106 2SC458A(C) FREQUENCY METER AMP
Pre-Set Meter Adjust
To TOUCH CONTROL SECTION (1)
CNS702
ME101 SIGNAL METER
To AUDIO SECTION
CNS203
To AUDIO SECTION PHONO MIC. AMP
ME102 PRE-SET METER
A LOUDNESS
B MONO
C FM MUTE
D AFC
SW101

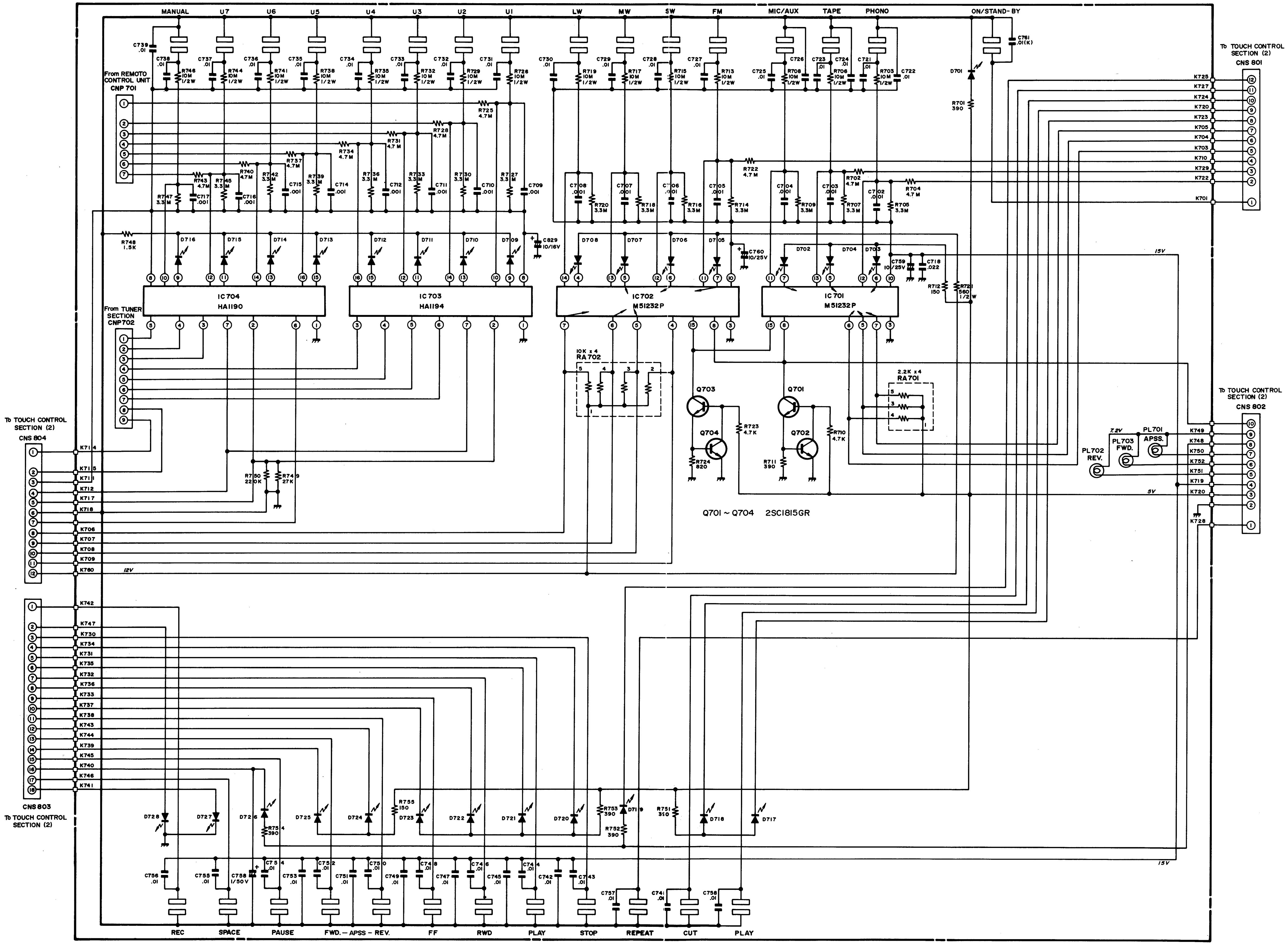
NOTES:

SW. NO.	FUNCTION	POSITION
SW501	RECORD/PLAYBACK	RECORD – PLAYBACK
SW502	NOISE CANSELER	A – B
SW503	EQUALIZOR SELECTOR	NORMAL – CrO_2 – FeCr
SW504	BIAS SELECTOR	NORMAL/Fe – Cr – CrO_2
SW505	ALC	ON – OFF
SW506	DOLBY NR	ON – OFF
SW507	CASSETE HOLDER	OPEN – CLOSE
SW508	FOOL – PLOOF	ON – OFF
SW509	CASSETE TAPE	YES – NON

VOLTAGE READINGS ARE MEASURED WITH VTVM UNDER NO SIGNAL
CAPACITANCE VALUES ARE IN MFD, P = MMFD
RESISTANSE VALUES ARE IN OHM, K = 1000, M = 1000K
MANUFACTURED UNDER LICENCE FROM DOLBY LABORATORIES

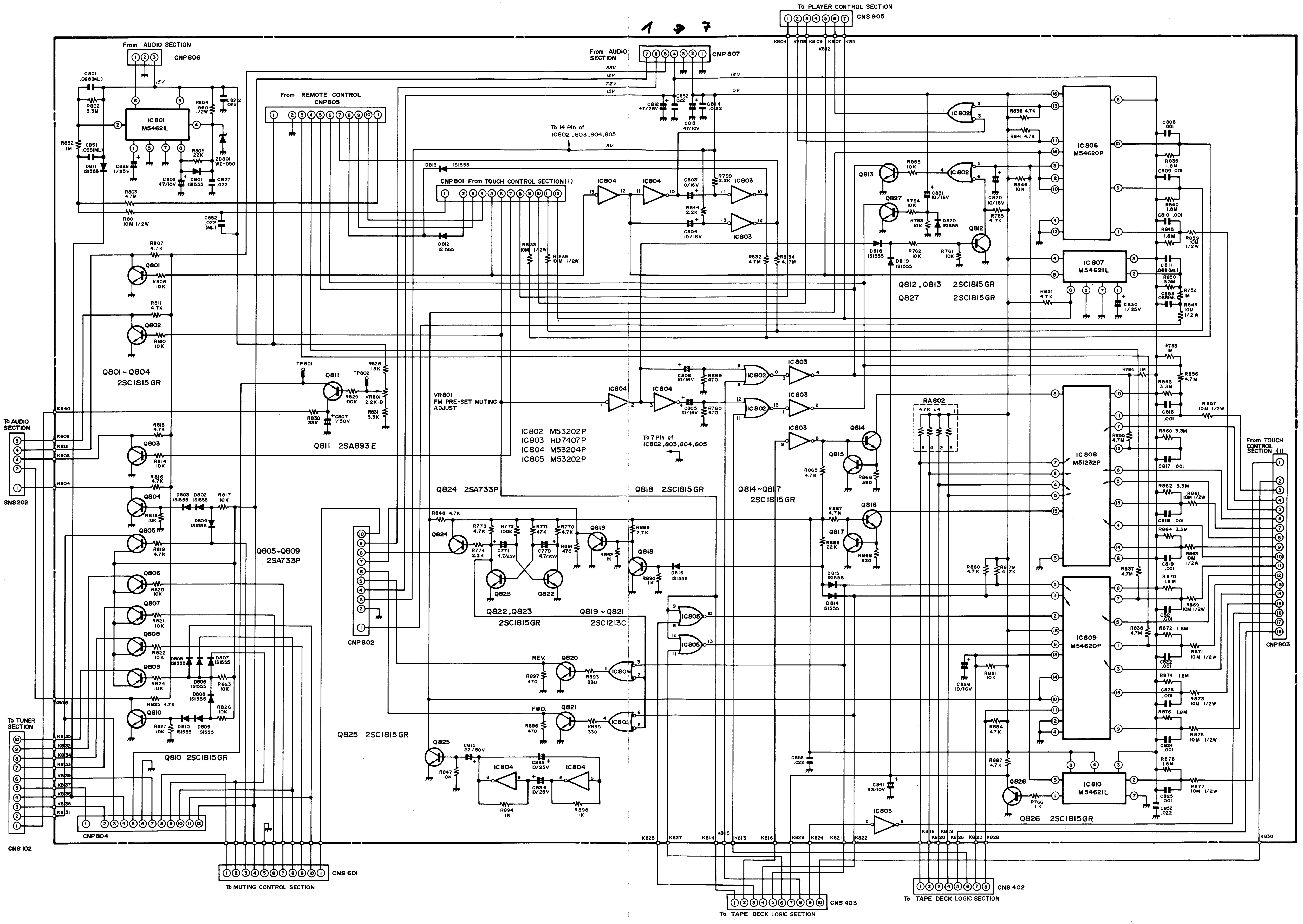
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 71–1 SCHEMATIC DIAGRAM (Tuner Section)


MANUAL
U7
U6
U5
U4
U3
U2
U1
LW
MW
SW
FM
MIC/AUX
TAPE
PHONO
ON/STAND-BY
From REMOTO CONTROL UNIT CNP 701
From TUNER SECTION CNP702
IC 704 HA1190
IC 703 HA1194
IC 702 M51232P
IC 701 M51232P
10K x 4 RA702
2.2K x 4 RA701
Q703
Q704
Q701
Q702
Q701 ~ Q704 2SC1815GR
To TOUCH CONTROL SECTION (2) CNS 801
To TOUCH CONTROL SECTION (2) CNS 802
To TOUCH CONTROL SECTION (2) CNS 804
CNS 803 To TOUCH CONTROL SECTION (2)
PL701 APSS.
PL702 REV.
PL703 FWD.
7.2V
15V
5V
12V
REC
SPACE
PAUSE
FWD. – APSS – REV.
FF
RWD
PLAY
STOP
REPEAT
CUT
PLAY

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

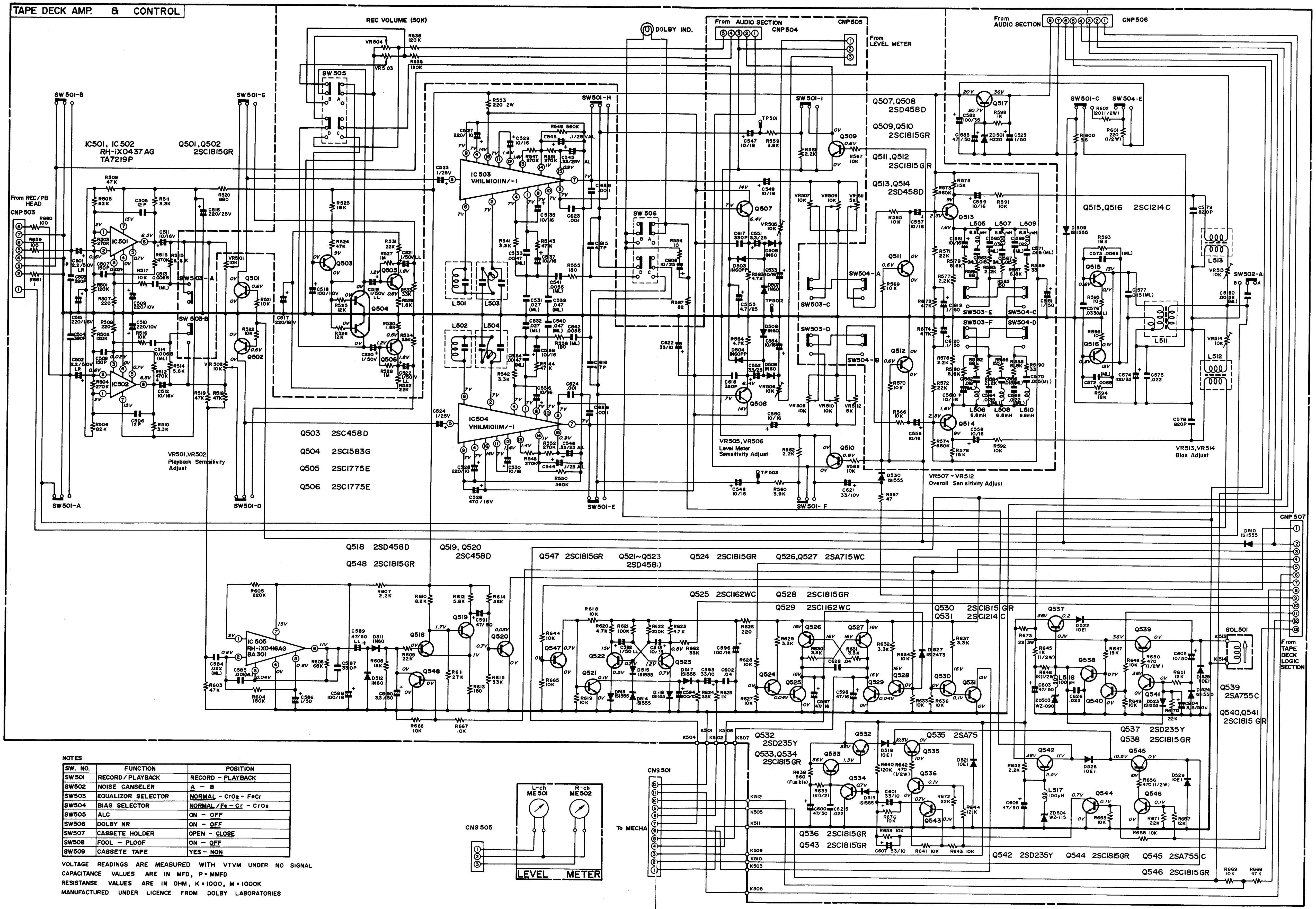
Figure 73–1 SCHEMATIC DIAGRAM (Touch Control Section 1)


To PLAYER CONTROL SECTION
CNS 905
From AUDIO SECTION
CNP 806
IC801 M5462IL
From AUDIO SECTION
CNP 807
From REMOTE CONTROL CNP805
To 14 Pin of IC802, 803, 804, 805
CNP 801 From TOUCH CONTROL SECTION (1)
IC804
IC803
IC802
IC806 M54620P
IC807 M5462IL
Q812, Q813 2SC1815GR
Q827 2SC1815GR
Q801~Q804 2SC1815GR
Q811 2SA893E
VR801 FM PRE-SET MUTING ADJUST
IC802 M53202P
IC803 HD7407P
IC804 M53204P
IC805 M53202P
To 7 Pin of IC802, 803, 804, 805
To AUDIO SECTION
SNS202
Q824 2SA733P
Q818 2SC1815GR
Q814~Q817 2SC1815GR
RA802
IC808 M51232P
From TOUCH CONTROL SECTION (1)
CNP803
Q805~Q809 2SA733P
CNP802
Q822, Q823 2SC1815GR
Q819~Q821 2SC1213C
REV.
FWD.
IC805
IC809 M54620P
To TUNER SECTION
Q810 2SC1815GR
Q825 2SC1815GR
IC810 M5462IL
Q826 2SC1815GR
CNP804
CNS 102
CNS 601
To MUTING CONTROL SECTION
CNS 403
To TAPE DECK LOGIC SECTION
CNS 402
To TAPE DECK LOGIC SECTION

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 75–1 SCHEMATIC DIAGRAM (Touch Control Section 2)

]


TAPE DECK AMP. & CONTROL
REC VOLUME (50K)
DOLBY IND.
From AUDIO SECTION
CNP505
CNP504
From LEVEL METER
CNP506
From REC/PB HEAD
CNP503
IC501, IC502
RH-iX0437AG
TA7219P
Q501,Q502
2SC1815GR
IC503
VHILM1011N/-1
IC504
VHILM1011M/-1
Q503 2SC458D
Q504 2SC1583G
Q505 2SC1775E
Q506 2SC1775E
Q507,Q508
2SD458D
Q509,Q510
2SC1815GR
Q511,Q512
2SC1815GR
Q513,Q514
2SD458D
Q515,Q516 2SC1214C
VR501,VR502
Playback Sensitivity Adjust
VR505,VR506
Level Meter Semsitivity Adjust
VR507~VR512
Overall Sen sitivity Adjust
VR513,VR514
Bias Adjust
SW501-A
SW501-B
SW501-D
SW501-E
SW501-F
SW501-G
SW501-H
SW501-I
SW501-C
SW504-E
SW502-A
SW503-A
SW503-B
SW503-C
SW503-D
SW503-E
SW503-F
SW504-A
SW504-B
SW504-C
SW504-D
SW505
SW506
L501
L502
L503
L504
L505
L506
L507
L508
L509
L510
L511
L512
L513
CNP507
Q518 2SD458D
Q548 2SC1815GR
Q519,Q520
2SC458D
IC505
RH-iX0416AG
BA301
Q547 2SC1815GR
Q521~Q523
2SD458D
Q524 2SC1815GR
Q525 2SC1162WC
Q526,Q527 2SA715WC
Q528 2SC1815GR
Q529 2SC1162WC
Q530 2SC1815GR
Q531 2SC1214C
Q537 2SD235Y
Q538 2SC1815GR
Q539
2SA755C
Q540,Q541
2SC1815GR
SOL501
From TAPE DECK LOGIC SECTION
Q532
2SD235Y
Q533,Q534
2SC1815GR
Q535 2SA75
Q536 2SC1815GR
Q543 2SC1815GR
Q542 2SD235Y
Q544 2SC1815GR
Q545 2SA755C
Q546 2SC1815GR
CNS501
CNS505
To MECHA
L-ch
ME501
R-ch
ME502
LEVEL METER

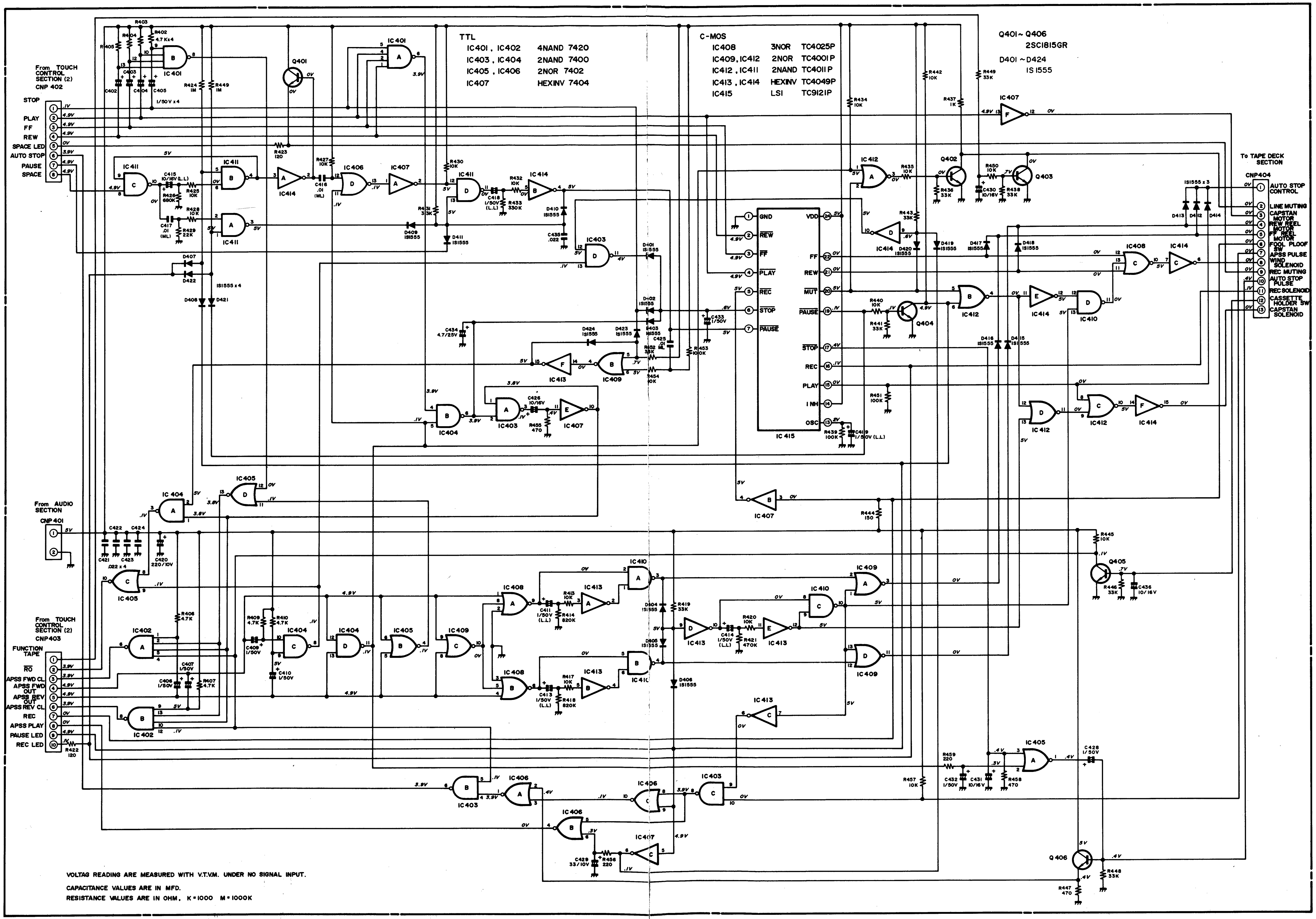
NOTES:

SW. NO.	FUNCTION	POSITION
SW501	RECORD/PLAYBACK	RECORD - PLAYBACK
SW502	NOISE CANSELER	A — B
SW503	EQUALIZOR SELECTOR	NORMAL - CrO_2 - FeCr
SW504	BIAS SELECTOR	NORMAL/Fe - Cr - CrO_2
SW505	ALC	ON - OFF
SW506	DOLBY NR	ON - OFF
SW507	CASSETE HOLDER	OPEN - CLOSE
SW508	FOOL - PLOOF	ON - OFF
SW509	CASSETE TAPE	YES - NON

VOLTAGE READINGS ARE MEASURED WITH VTVM UNDER NO SIGNAL
CAPACITANCE VALUES ARE IN MFD, P = MMFD
RESISTANSE VALUES ARE IN OHM, K = 1000, M = 1000K
MANUFACTURED UNDER LICENCE FROM DOLBY LABORATORIES

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

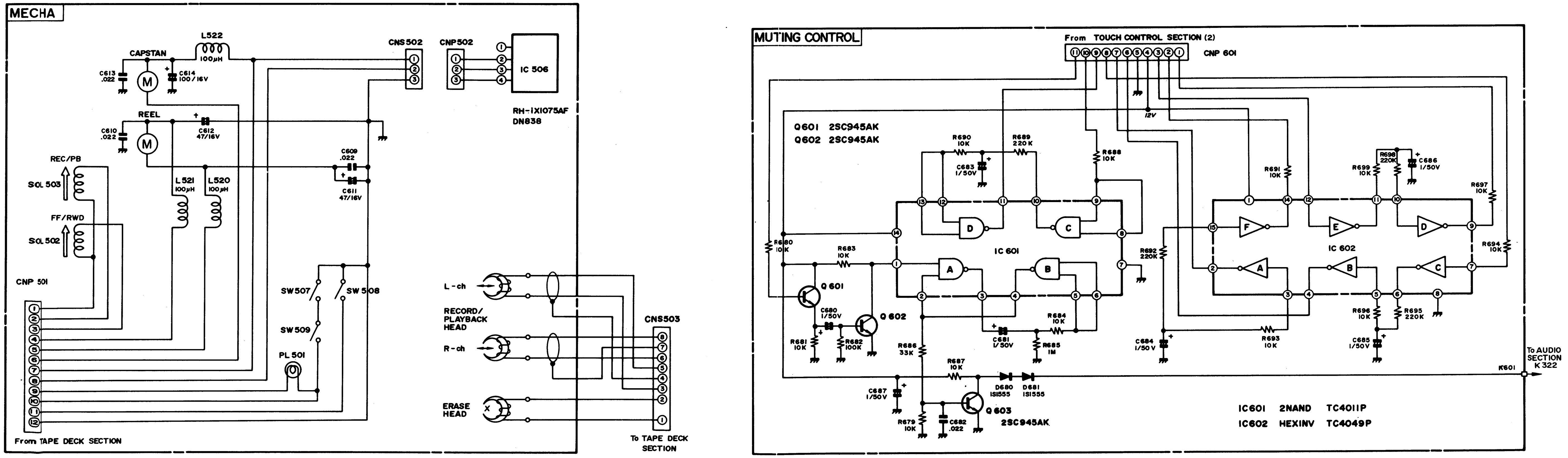
Figure 77–1 SCHEMATIC DIAGRAM (Tape Deck Section)


From TOUCH CONTROL SECTION (2) CNP 402
STOP
PLAY
FF
REW
SPACE LED
AUTO STOP
PAUSE
SPACE
TTL
IC401, IC402 4NAND 7420
IC403, IC404 2NAND 7400
IC405, IC406 2NOR 7402
IC407 HEXINV 7404
C-MOS
IC408 3NOR TC4025P
IC409, IC412 2NOR TC4001P
IC412, IC411 2NAND TC4011P
IC413, IC414 HEXINV TC4049P
IC415 LSI TC9121P
Q401~Q406 2SC1815GR
D401~D424 1S1555
IC415
GND
REW
FF
PLAY
REC
STOP
PAUSE
VDD
FF
REW
MUT
PAUSE
STOP
REC
PLAY
INH
OSC
To TAPE DECK SECTION
CNP404
AUTO STOP CONTROL
LINE MUTING
CAPSTAN MOTOR
REW REEL MOTOR
FF REEL MOTOR
FOOL PLOOF SW
APSS PULSE
WIND SOLENOID
REC MUTING
AUTO STOP PULSE
REC SOLENOID
CASSETTE HOLDER SW
CAPSTAN SOLENOID
From AUDIO SECTION
CNP401
From TOUCH CONTROL SECTION (2)
CNP403
FUNCTION TAPE
RO
APSS FWD CL
APSS FWD OUT
APSS REV OUT
APSS REV CL
REC
APSS PLAY
PAUSE LED
REC LED

VOLTAG READING ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL INPUT.
CAPACITANCE VALUES ARE IN MFD.
RESISTANCE VALUES ARE IN OHM. K=1000 M=1000K

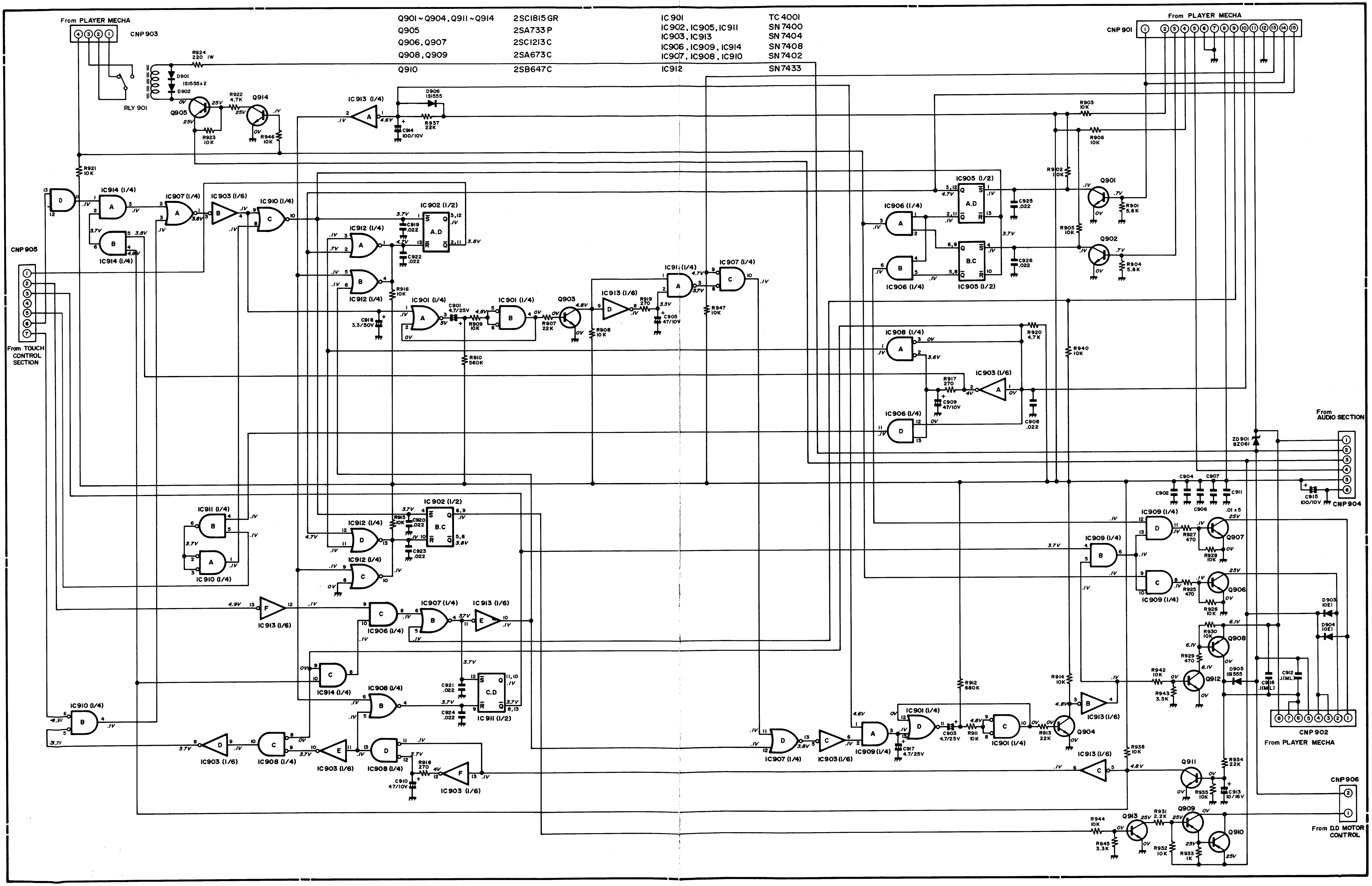
(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 79–1 SCHEMATIC DIAGRAM (Tape Deck Logic Section)


MECHA
L522
100μH
CAPSTAN
C613
.022
C614
100/16V
M
REEL
C610
.022
C612
47/16V
M
REC/PB
SOL 503
FF/RWD
SOL 502
L521
100μH
L520
100μH
C609
.022
C611
47/16V
CNS502
CNP502
IC 506
RH-IX1075AF
DN838
CNP 501
SW507
SW508
SW509
PL501
L-ch
RECORD/
PLAYBACK
HEAD
R-ch
ERASE
HEAD
CNS503
From TAPE DECK SECTION
To TAPE DECK
SECTION
MUTING CONTROL
From TOUCH CONTROL SECTION (2)
CNP 601
12V
Q601 2SC945AK
Q602 2SC945AK
R690
10K
R689
220K
C683
1/50V
R688
10K
IC 601
R6180
10K
R683
10K
Q601
Q602
C680
1/50V
R681
10K
R682
100K
R686
33K
R684
10K
C681
1/50V
R685
1M
R687
10K
D680
1S1555
D681
1S1555
C687
1/50V
Q603
2SC945AK
R679
10K
C682
.022
R691
10K
R699
10K
R698
220K
C686
1/50V
R697
10K
R692
220K
IC 602
R694
10K
C684
1/50V
R693
10K
R696
10K
R695
220K
C685
1/50V
To AUDIO
SECTION
K322
K601
IC601 2NAND TC4011P
IC602 HEXINV TC4049P

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 81–1 SCHEMATIC DIAGRAM (Tape Deck Mechanism/Muting Control Section)



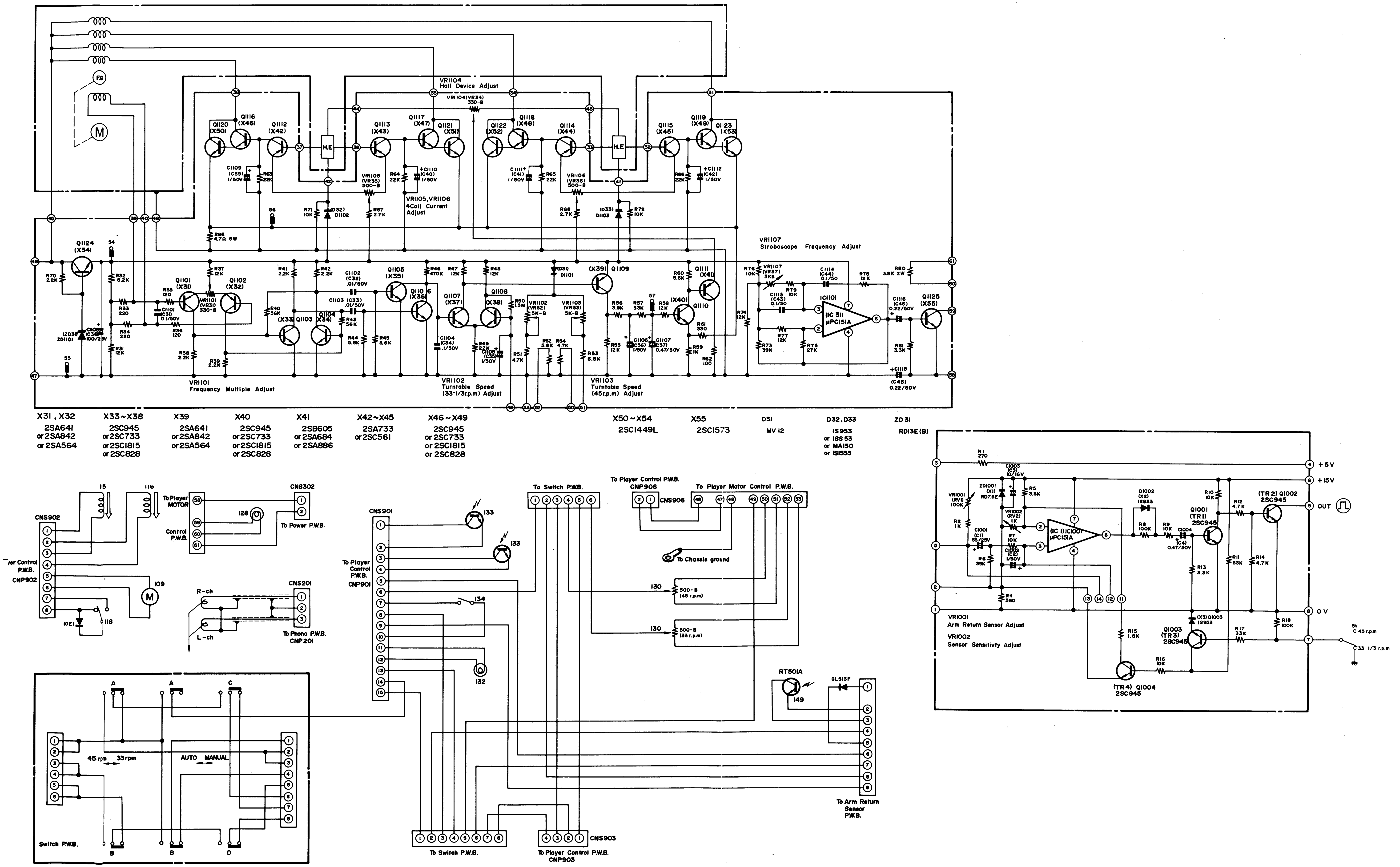
From PLAYER MECHA
CNP903
RLY 901
R924 220 1W
D901 1S1555x2
D902
Q905
Q914
R922 4.7K
R923 10K
R946 10K
IC913 (1/4)
D906 1S1555
R937 22K
C914 100/10V
R921 10K
IC914 (1/4)
IC907 (1/4)
IC903 (1/6)
IC910 (1/4)
IC902 (1/2)
C919 .022
C922 .022
IC912 (1/4)
R916 10K
IC901 (1/4)
C901 4.7/25V
C918 3.3/50V
R909 10K
R910 560K
R907 22K
Q903
R908 10K
IC913 (1/6)
R919 270
C905 47/10V
IC911 (1/4)
R947 10K
CNP905
From TOUCH CONTROL SECTION
IC911 (1/4)
IC910 (1/4)
R915 10K
C920 .022
C923 .022
IC906 (1/4)
IC913 (1/6)
C921 .022
C924 .022
IC911 (1/2)
IC908 (1/4)
R918 270
C910 47/10V
IC903 (1/6)
From PLAYER MECHA
CNP901
R903 10K
R906 10K
IC905 (1/2)
C925 .022
C926 .022
R902 10K
R905 10K
Q901
R901 5.6K
Q902
R904 5.6K
R920 4.7K
R940 10K
R917 270
C909 47/10V
C908 .022
From AUDIO SECTION
ZD901 BZ061
CNP904
C902
C904
C906
C907
C911
.01 x 5 25V
C915 100/10V
IC909 (1/4)
Q907
R927 470
R928 10K
Q906
R925 470
R926 10K
D903 10E1
D904 10E1
R930 10K
Q908
R929 470
D905 1S1555
R942 10K
R943 3.3K
Q912
C916 .1(ML)
C912 .1(ML)
R912 680K
R914 10K
C903 4.7/25V
C917 4.7/25V
R911 10K
R913 22K
Q904
CNP902
From PLAYER MECHA
R938 10K
Q911
R934 22K
R935 10K
C913 10/16V
CNP906
From D.D MOTOR CONTROL
R944 10K
R945 3.3K
Q913
R931 2.2K
Q909
R932 10K
R933 1K
Q910

Q901 ~ Q904, Q911 ~ Q914	2SC1815GR
Q905	2SA733P
Q906, Q907	2SC1213C
Q908, Q909	2SA673C
Q910	2SB647C

IC901	TC4001
IC902, IC905, IC911	SN7400
IC903, IC913	SN7404
IC906, IC909, IC914	SN7408
IC907, IC908, IC910	SN7402
IC912	SN7433

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 83–1 SCHEMATIC DIAGRAM (Player Control Section)



VR1104 Hall Device Adjust
VR1104(VR34) 330-B
Q1116 (X46)
Q1112 (X42)
Q1120 (X50)
Q1113 (X43)
Q1117 (X47)
Q1121 (X51)
Q1122 (X52)
Q1118 (X48)
Q1114 (X44)
Q1115 (X45)
Q1119 (X49)
Q1123 (X53)
H.E
VR1105,VR1106 4Coil Current Adjust
VR1105 (VR35) 500-B
VR1106 (VR36) 500-B
R66 4.7Ω 5W
Q1124 (X54)
Q1101 (X31)
Q1102 (X32)
VR1101 (VR31) 330-B
Q1103 (X33)
Q1104 (X34)
Q1105 (X35)
Q1106 (X36)
Q1107 (X37)
Q1108 (X38)
Q1109 (X39)
Q1110 (X40)
Q1111 (X41)
VR1102 (VR32) 5K-B
VR1103 (VR33) 5K-B
VR1107 Stroboscope Frequency Adjust
VR1107 (VR37) 5K-B
IC1101 (IC 31) μPC151A
Q1125 (X55)
R80 3.9K 2W
VR1101 Frequency Multiple Adjust
VR1102 Turntable Speed (33-1/3r.p.m) Adjust
VR1103 Turntable Speed (45r.p.m) Adjust
CNS902
Player Control P.W.B. CNP902
To Player MOTOR
Control P.W.B.
CNS302
To Power P.W.B.
CNS201
R-ch
L-ch
To Phono P.W.B. CNP201
CNS901
To Player Control P.W.B. CNP901
To Switch P.W.B.
To Player Control P.W.B. CNP906
CNS906
To Player Motor Control P.W.B.
To Chassis ground
130 500-B (45 r.p.m)
130 500-B (33 r.p.m)
RT501A
GL513F
To Arm Return Sensor P.W.B.
CNS903
To Player Control P.W.B. CNP903
Switch P.W.B.
45 rpm 33rpm
AUTO MANUAL
A
C
B
D
+5V
+15V
OUT
0V
IC1 IC1001 μPC151A
Q1001 (TR1) 2SC945
(TR2) Q1002 2SC945
Q1003 (TR3) 2SC945
(TR4) Q1004 2SC945
VR1001 Arm Return Sensor Adjust
VR1002 Sensor Sensitivty Adjust
5V 0 45r.p.m
0 33 1/3 r.p.m

X31, X32	X33~X38	X39	X40	X41	X42~X45	X46~X49	X50~X54	X55	D31	D32, D33	ZD 31
2SA641 or 2SA842 or 2SA564	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SA641 or 2SA842 or 2SA564	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SB605 or 2SA684 or 2SA886	2SA733 or 2SC561	2SC945 or 2SC733 or 2SC1815 or 2SC828	2SC1449L	2SC1573	MV 12	1S953 or ISS 53 or MA150 or IS1555	RD13E(B)

(Specifications of wiring diagrams of this model are subject to change for the improvement without prior notice.)

Figure 85–1 SCHEMATIC DIAGRAM (Player Motor Control/Arm Return Sensor/Player Mechanism Section)

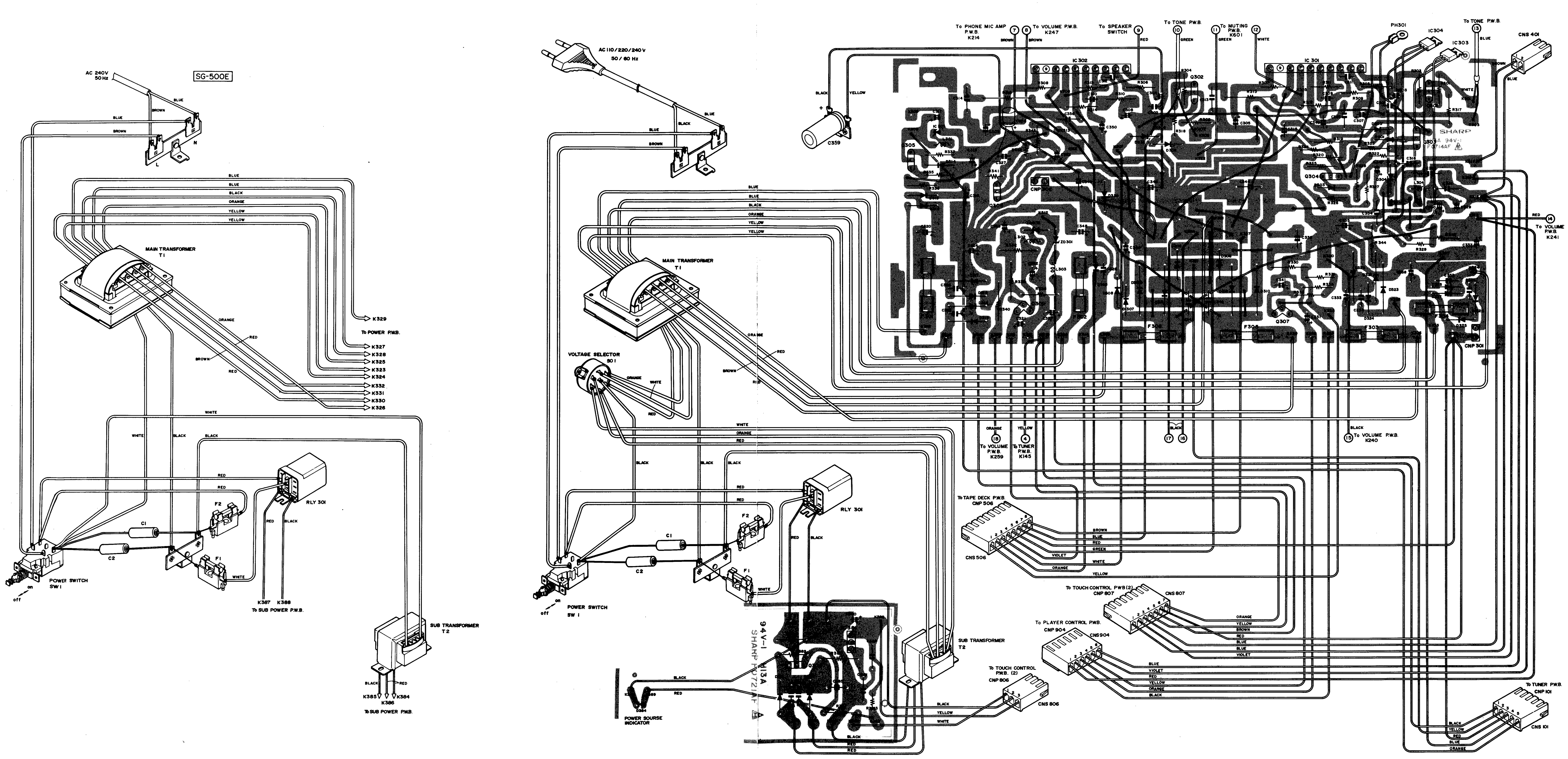

SG-500E
AC 240V 50Hz
MAIN TRANSFORMER T1
K329
To POWER P.W.B.
K327
K328
K325
K323
K324
K332
K331
K330
K326
RLY 301
F2
F1
C1
C2
POWER SWITCH SW1
on
off
K387 K388
To SUB POWER P.W.B.
SUB TRANSFORMER T2
K385 K386 K384
To SUB POWER P.W.B.
AC 110/220/240V 50/60Hz
VOLTAGE SELECTOR S01
C359
To PHONE MIC AMP P.W.B. K214
⑦ ⑧ To VOLUME P.W.B. K247
To SPEAKER SWITCH ⑨
To TONE P.W.B. ⑩
⑪ To MUTING P.W.B. K601 ⑫
PH301
IC304
IC303
To TONE P.W.B. ⑬
CNS 401
IC 302
IC 301
Q302
SHARP 94V-1
⑭ To VOLUME P.W.B. K241
CNP 301
⑱ To VOLUME P.W.B. K259
④ To TUNER P.W.B. K145
⑰ ⑯
⑮ To VOLUME P.W.B. K240
To TAPE DECK P.W.B. CNP 506
CNS 506
To TOUCH CONTROL P.W.B.(2) CNP 807
CNS 807
To PLAYER CONTROL P.W.B. CNP 904
CNS904
To TOUCH CONTROL P.W.B. (2) CNP 806
CNS 806
To TUNER P.W.B. CNP 101
CNS 101
POWER SOURSE INDICATOR
BLUE
BROWN
BLACK
ORANGE
YELLOW
RED
WHITE
GREEN
VIOLET

Figure 87—1 WIRING SIDE OF P.W. BOARD (Power/Sub-Power)

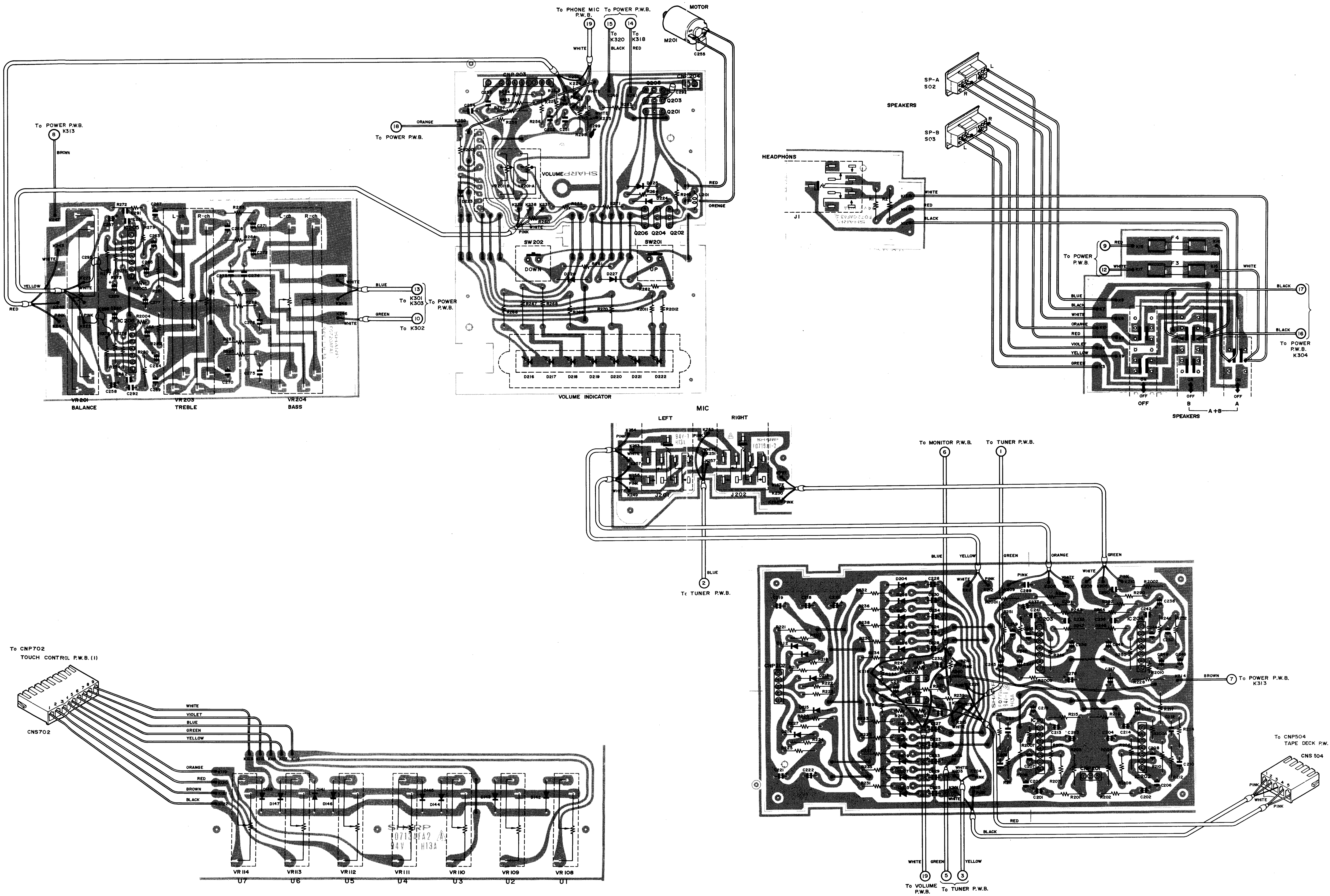

To PHONE MIC P.W.B.
To POWER P.W.B.
To K320
To K318
MOTOR
M201
WHITE
BLACK
RED
CNP203
CNP204
Q203
Q201
To POWER P.W.B.
ORANGE
VOLUME
SHARP
D225
D224
Q206 Q204 Q202
SW202
DOWN
SW201
UP
D216 D217 D218 D219 D220 D221 D222
VOLUME INDICATOR
To POWER P.W.B. K313
BROWN
YELLOW
PINK
VR201
BALANCE
VR203
TREBLE
VR204
BASS
L-ch
R-ch
BLUE
GREEN
To K301 K303
To POWER P.W.B.
To K302
SPEAKERS
SP-A S02
SP-B S03
HEADPHONS
J1
To POWER P.W.B.
F4
F3
VIOLET
To POWER P.W.B. K304
OFF
B
A+B
A
SPEAKERS
MIC
LEFT
RIGHT
J201
J202
To TUNER P.W.B.
To MONITOR P.W.B.
To TUNER P.W.B.
IC203
IC204
To POWER P.W.B. K313
To CNP504 TAPE DECK P.W.B.
CNS 504
To VOLUME P.W.B.
To TUNER P.W.B.
To CNP702 TOUCH CONTROL P.W.B. (1)
CNS702
WHITE
VIOLET
BLUE
GREEN
YELLOW
ORANGE
RED
BROWN
BLACK
VR114
VR113
VR112
VR111
VR110
VR109
VR108
U7
U6
U5
U4
U3
U2
U1

Figure 89–1 WIRING SIDE OF P.W. BOARD (Volume Control/Tone/FM Pre-set/Speakers Selector/Headphone/MIC/Pre-Amp.)

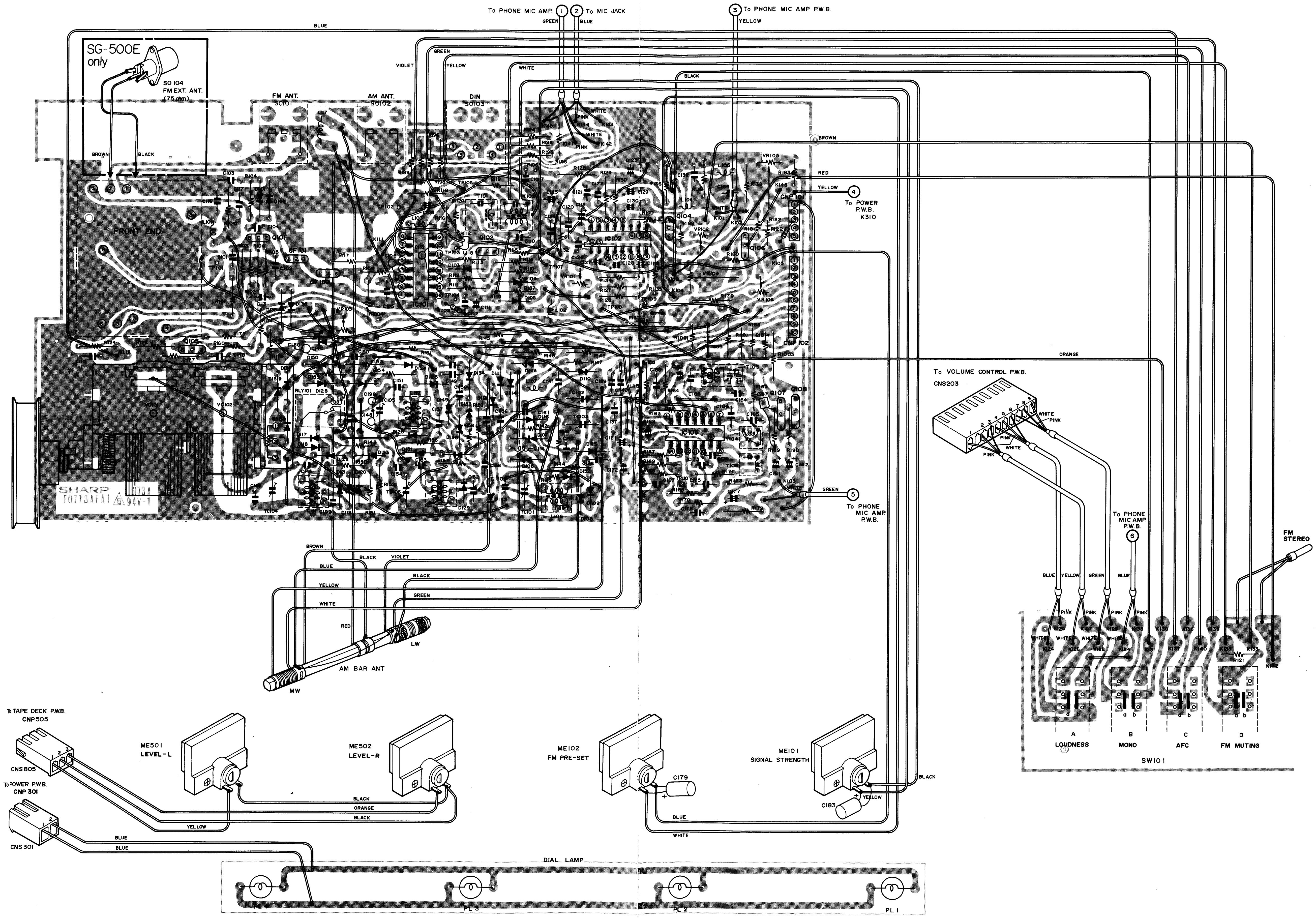

To PHONE MIC AMP.
①
②
To MIC JACK
③
To PHONE MIC AMP P.W.B.
GREEN
BLUE
YELLOW
BLUE
VIOLET
GREEN
YELLOW
WHITE
BLACK
SG-500E only
SO 104
FM EXT. ANT.
(75 ohm)
BROWN
BLACK
FM ANT.
SO101
AM ANT.
SO102
DIN
SO103
FRONT END
CF101
CF102
IC101
IC102
IC103
VR101
VR102
VR104
VR105
VR106
T101
T102
CNP 101
CNP 102
RLY101
VC101
VC102
SHARP
F0713AFA1
94V-1
BROWN
RED
YELLOW
④
To POWER P.W.B.
K310
ORANGE
GREEN
⑤
To PHONE MIC AMP. P.W.B.
To VOLUME CONTROL P.W.B.
CNS203
WHITE
PINK
To PHONE MIC AMP. P.W.B.
⑥
BLUE
YELLOW
GREEN
BLUE
FM STEREO
K125
K127
K129
K135
K130
K136
K139
K133
K124
K126
K128
K134
K131
K137
K140
K138
R121
K132
A
LOUDNESS
B
MONO
C
AFC
D
FM MUTING
SW101
BROWN
BLUE
YELLOW
WHITE
BLACK
VIOLET
BLACK
GREEN
RED
LW
AM BAR ANT
MW
To TAPE DECK P.W.B.
CNP505
CNS805
To POWER P.W.B.
CNP 301
CNS301
ME501
LEVEL-L
ME502
LEVEL-R
BLACK
ORANGE
BLACK
YELLOW
BLUE
BLUE
ME102
FM PRE-SET
C179
ME101
SIGNAL STRENGTH
C183
YELLOW
BLACK
BLUE
WHITE
DIAL LAMP
PL 4
PL 3
PL 2
PL 1

Figure 91–1 WIRING SIDE OF P.W. BOARD (Tuner/Lamp)

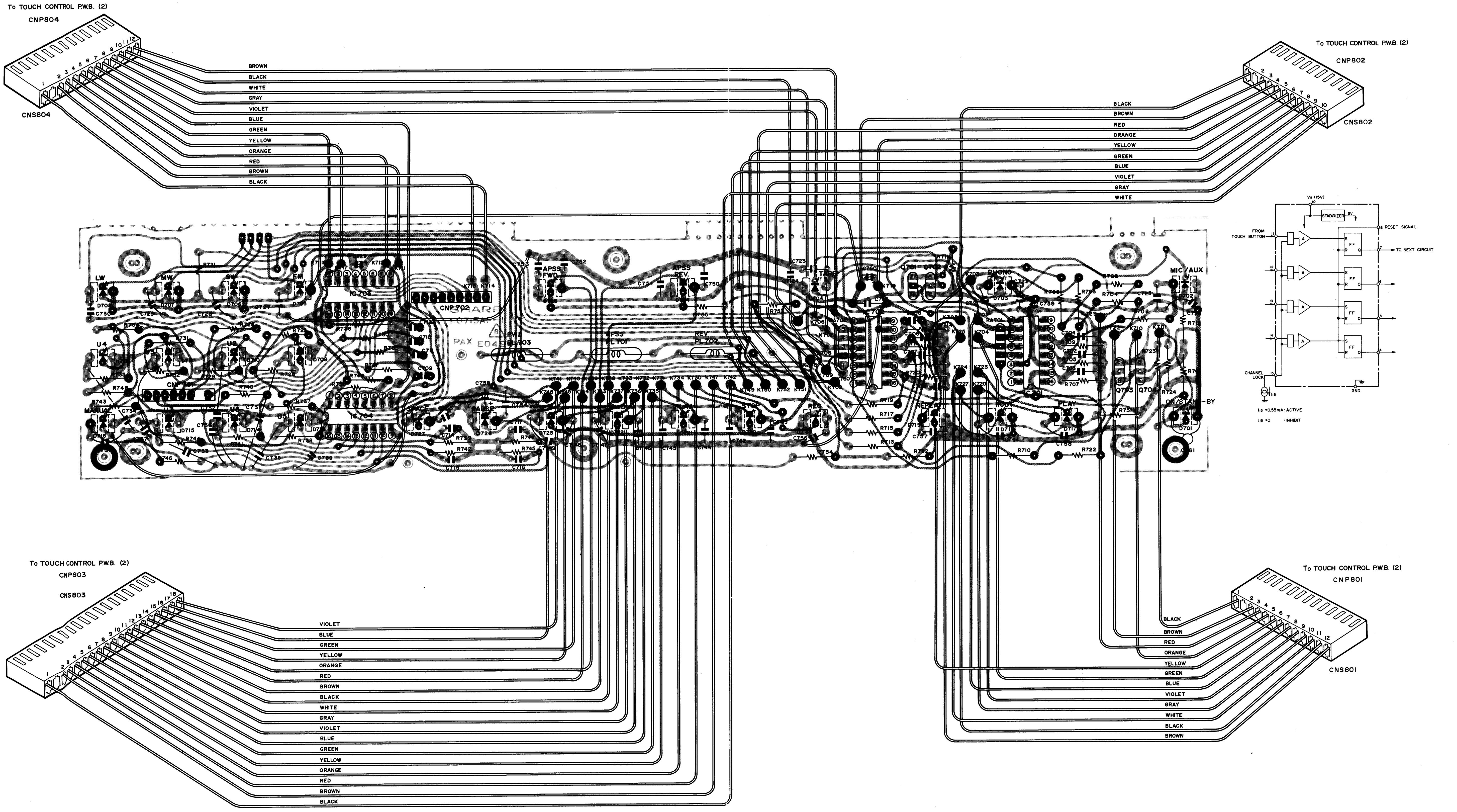

To TOUCH CONTROL P.W.B. (2)
CNP804
CNS804
BROWN
BLACK
WHITE
GRAY
VIOLET
BLUE
GREEN
YELLOW
ORANGE
RED
BROWN
BLACK
To TOUCH CONTROL P.W.B. (2)
CNP802
CNS802
BLACK
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
VIOLET
GRAY
WHITE
LW
MW
SW
FM
U4
U5
U6
MANUAL
IC703
IC704
CNP702
SHARP
PAX
APSS FWD
APSS REV.
APSS PL701
REV PL702
PHONO
MIC/AUX
Q701
Q702
Q703
Q704
IC701
IC702
PAUSE
REPEAT
MUTE
PLAY
STOP
REC
ON/STAND-BY
To TOUCH CONTROL P.W.B. (2)
CNP803
CNS803
VIOLET
BLUE
GREEN
YELLOW
ORANGE
RED
BROWN
BLACK
WHITE
GRAY
VIOLET
BLUE
GREEN
YELLOW
ORANGE
RED
BROWN
BLACK
To TOUCH CONTROL P.W.B. (2)
CNP801
CNS801
BLACK
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
VIOLET
GRAY
WHITE
BLACK
BROWN
Vs (15V)
10
STABIRIZER
5V
8 RESET SIGNAL
FROM TOUCH BUTTON
11
12
13
14
S FF R Q
A
7
TO NEXT CIRCUIT
6
5
4
CHANNEL LOCK
15
I15
GND
I15 =0.55mA : ACTIVE
I15 =0 :INHIBIT

Figure 93–1 WIRING SIDE OF P.W. BOARD (Touch Control 1)

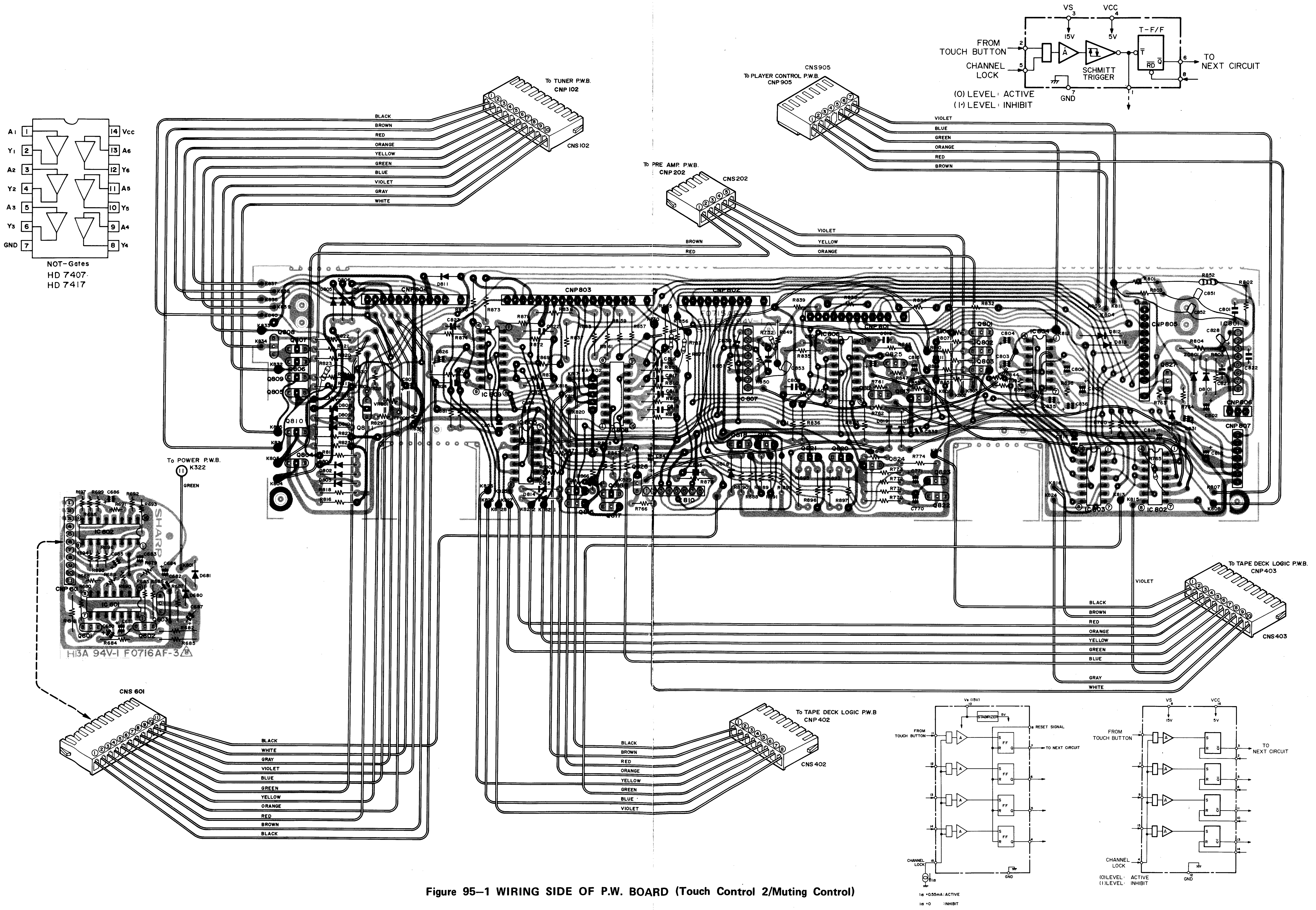
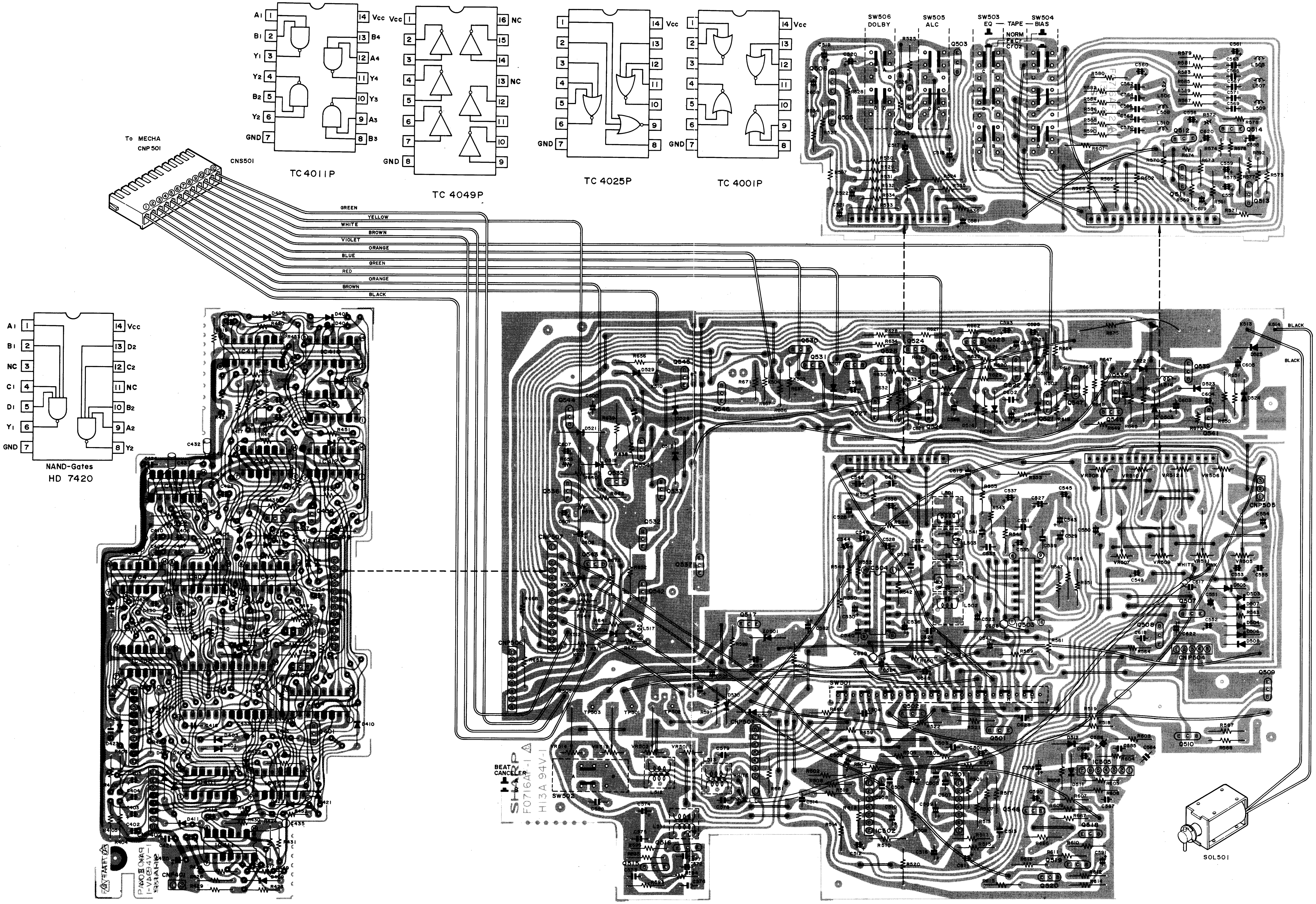
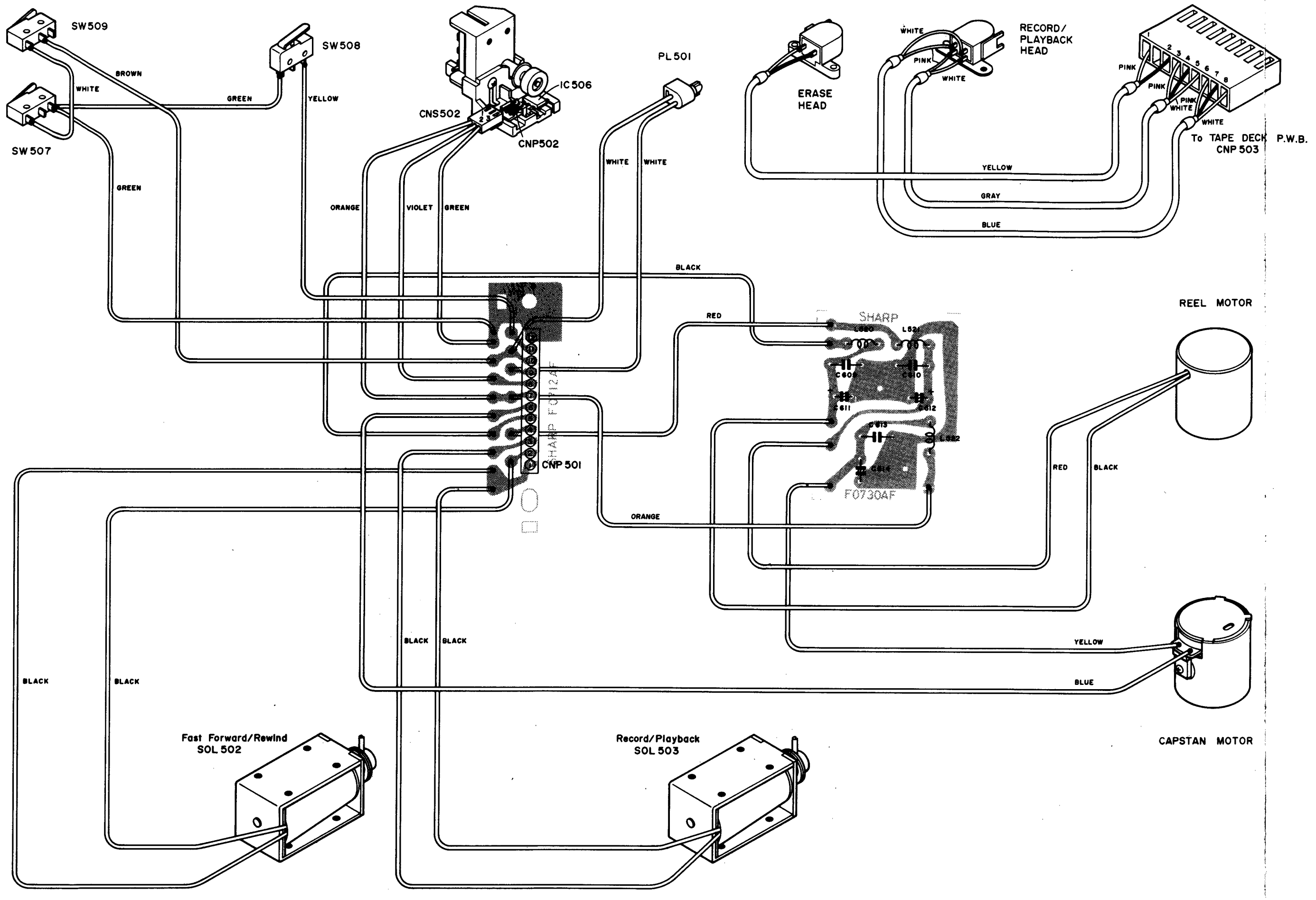
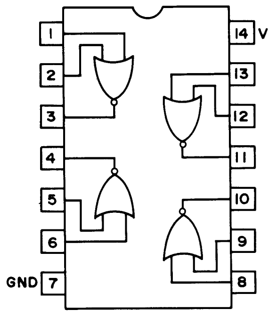

A1 1
Y1 2
A2 3
Y2 4
A3 5
Y3 6
GND 7
14 Vcc
13 A6
12 Y6
11 A5
10 Y5
9 A4
8 Y4
NOT-Gates
HD 7407
HD 7417
To TUNER P.W.B.
CNP 102
CNS102
BLACK
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
VIOLET
GRAY
WHITE
To PRE AMP. P.W.B.
CNP 202
CNS202
CNS905
To PLAYER CONTROL P.W.B.
CNP 905
VS
VCC
15V
5V
FROM
TOUCH BUTTON
CHANNEL
LOCK
SCHMITT
TRIGGER
T-F/F
TO
NEXT CIRCUIT
GND
(0) LEVEL : ACTIVE
(1) LEVEL : INHIBIT
CNP803
CNP802
CNP804
CNP805
CNP806
CNP807
IC801
IC802
IC803
IC804
IC805
IC806
IC807
IC808
IC809
To POWER P.W.B.
K322
GREEN
IC602
IC601
CNP601
SHARP
H13A 94V-1 F0716AF-3
CNS 601
To TAPE DECK LOGIC P.W.B
CNP 402
CNS 402
To TAPE DECK LOGIC P.W.B.
CNP403
CNS403
Vs (15V)
STABILIZER
RESET SIGNAL
TO NEXT CIRCUIT
FF
I18
I18 = 0.55mA : ACTIVE
I18 = 0 : INHIBIT
(0)LEVEL : ACTIVE
(1)LEVEL : INHIBIT

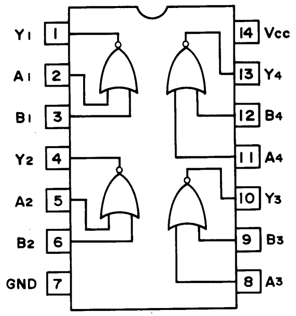
Figure 95–1 WIRING SIDE OF P.W. BOARD (Touch Control 2/Muting Control)


TC4011P
TC 4049P
TC 4025P
TC 4001P
NAND-Gates
HD 7420
A1
B1
Y1
Y2
B2
Y2
GND
Vcc
B4
A4
Y4
Y3
A3
B3
NC
C1
D1
D2
C2
A2
To MECHA
CNP501
CNS501
GREEN
YELLOW
WHITE
BROWN
VIOLET
ORANGE
BLUE
GREEN
RED
ORANGE
BROWN
BLACK
SW506
DOLBY
SW505
ALC
SW503
EQ
TAPE
SW504
BIAS
NORM
FeCr
CrO2
BLACK
SOL501
BEAT CANCELLER
SW502
SW501
CNP503
CNP504
CNP505
CNP506
CNP507
IC501
IC502
IC503
IC504
IC505
Q501
Q502
Q503
Q504
Q505
Q506
Q507
Q508
Q509
Q510
Q511
Q512
Q513
Q514
Q517
Q518
Q519
Q520
Q530
Q531
Q532
Q533
Q535
Q536
Q539
Q541
Q542
Q543
Q546
Q547
VR501
VR502
VR503
VR504
VR505
VR506
VR507
VR508
VR509
VR510
VR511
VR512
WHITE
L502
L503
L505
L506
L507
L508
L509
L510
L512
L517
R513
R514
R567
R568
D410
D421
C432
C435
F0716A-1
H13A 94V-1
Figure 97–1 WIRING SIDE OF P.W. BOARD (Tape Deck Logic/Tape Deck)

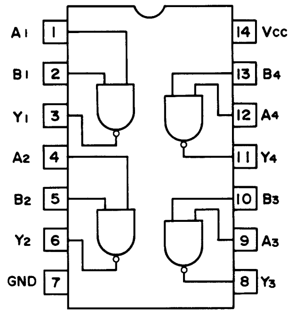

SW509
SW508
SW507
BROWN
WHITE
GREEN
YELLOW
CNS502
IC506
CNP502
PL501
ORANGE
VIOLET
WHITE
ERASE HEAD
RECORD/ PLAYBACK HEAD
PINK
To TAPE DECK P.W.B. CNP503
YELLOW
GRAY
BLUE
BLACK
RED
SHARP
CNP501
F0730AF
REEL MOTOR
CAPSTAN MOTOR
Fast Forward/Rewind SOL 502
Record/Playback SOL 503


1
2
3
4
5
6
GND 7
14 Vcc
13
12
11
10
9
8

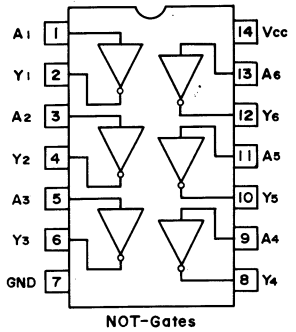
TC 4001P


Y1 1
A1 2
B1 3
Y2 4
A2 5
B2 6
GND 7
14 Vcc
13 Y4
12 B4
11 A4
10 Y3
9 B3
8 A3

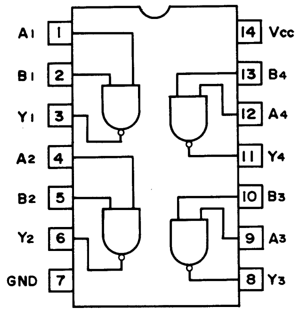
NOR-Gates
HD 7402
SN 7403
SN 7433


A1 1
B1 2
Y1 3
A2 4
B2 5
Y2 6
GND 7
14 Vcc
13 B4
12 A4
11 Y4
10 B3
9 A3
8 Y3

AND-Gates
SN,HD 7408
HD 7409


A1 1
Y1 2
A2 3
Y2 4
A3 5
Y3 6
GND 7
14 Vcc
13 A6
12 Y6
11 A5
10 Y5
9 A4
8 Y4

NOT-Gates
HD 7404 · HD 7406
HD 7405 · HD 7416
SN 7404 · SN 7406


A1 1
B1 2
Y1 3
A2 4
B2 5
Y2 6
GND 7
14 Vcc
13 B4
12 A4
11 Y4
10 B3
9 A3
8 Y3

NAND-Gates
HD 7400
HD 7403
SN 7400

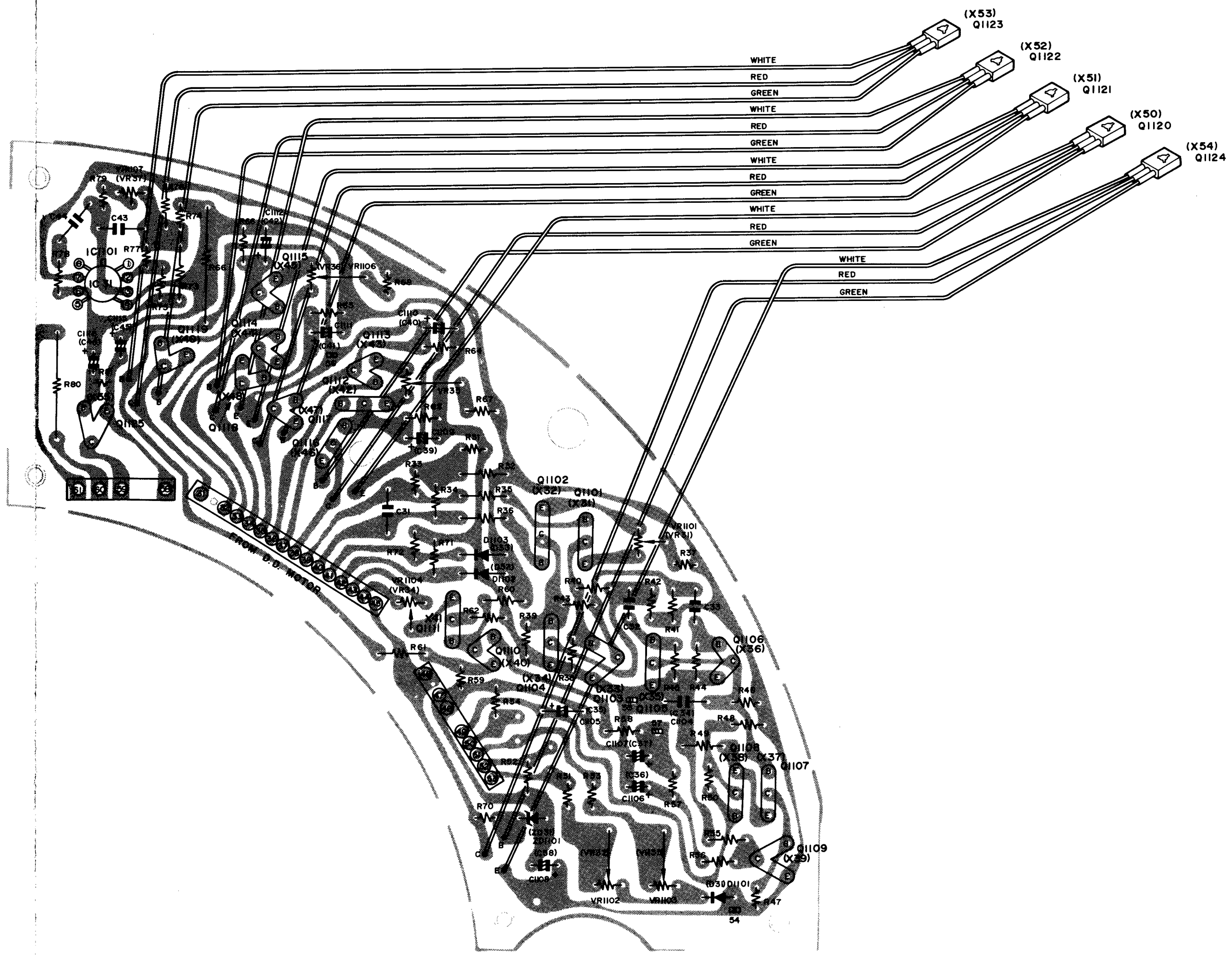

(X53) Q1123
(X52) Q1122
(X51) Q1121
(X50) Q1120
(X54) Q1124
WHITE
RED
GREEN
IC1101
R80
Q1102
Q1101
Q1106
Q1107
Q1109
VR1101
VR1102

Figure 99—1 WIRING SIDE OF P.W. BOARD (Tape Deck Mechanism/Player Motor Control)

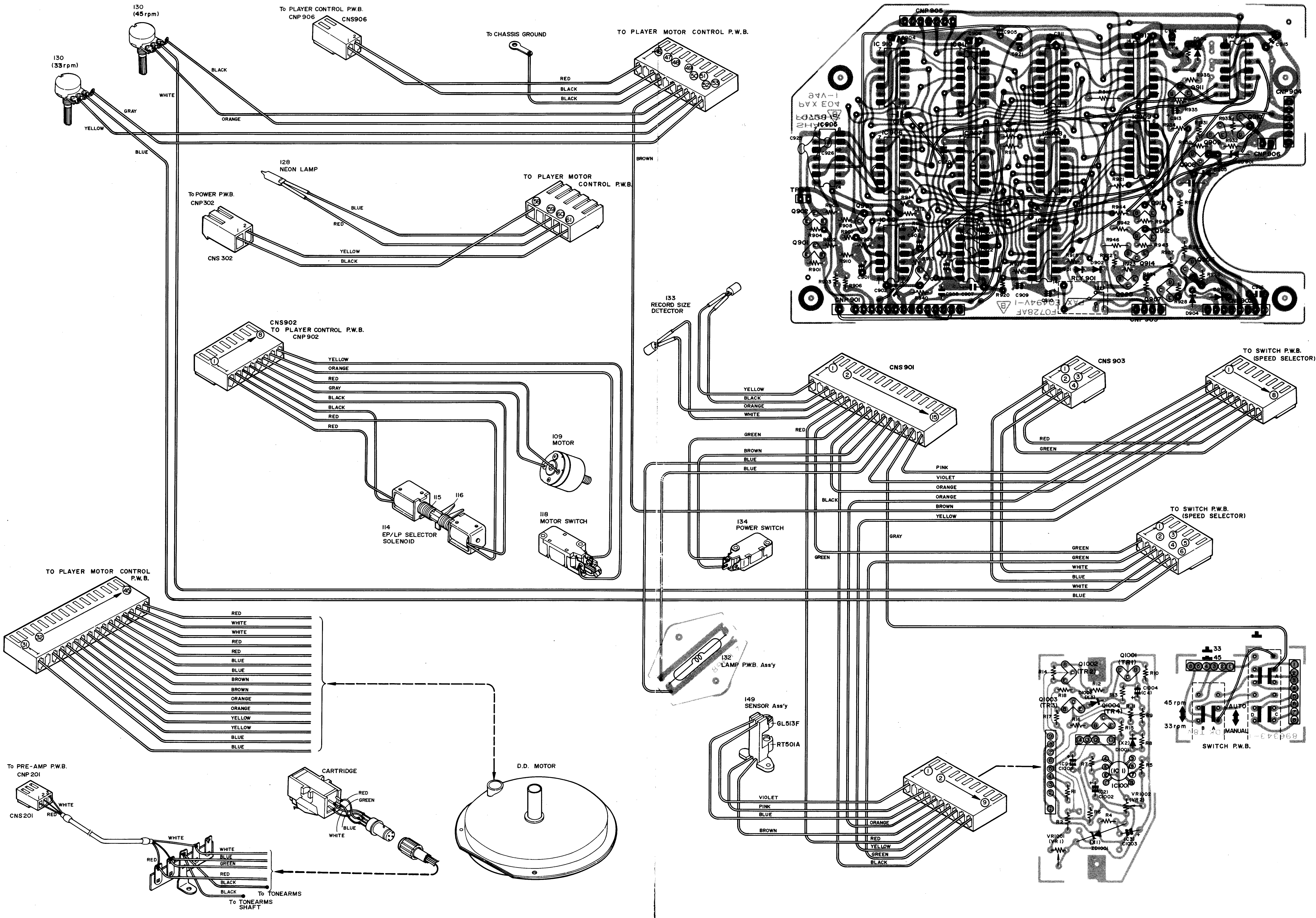
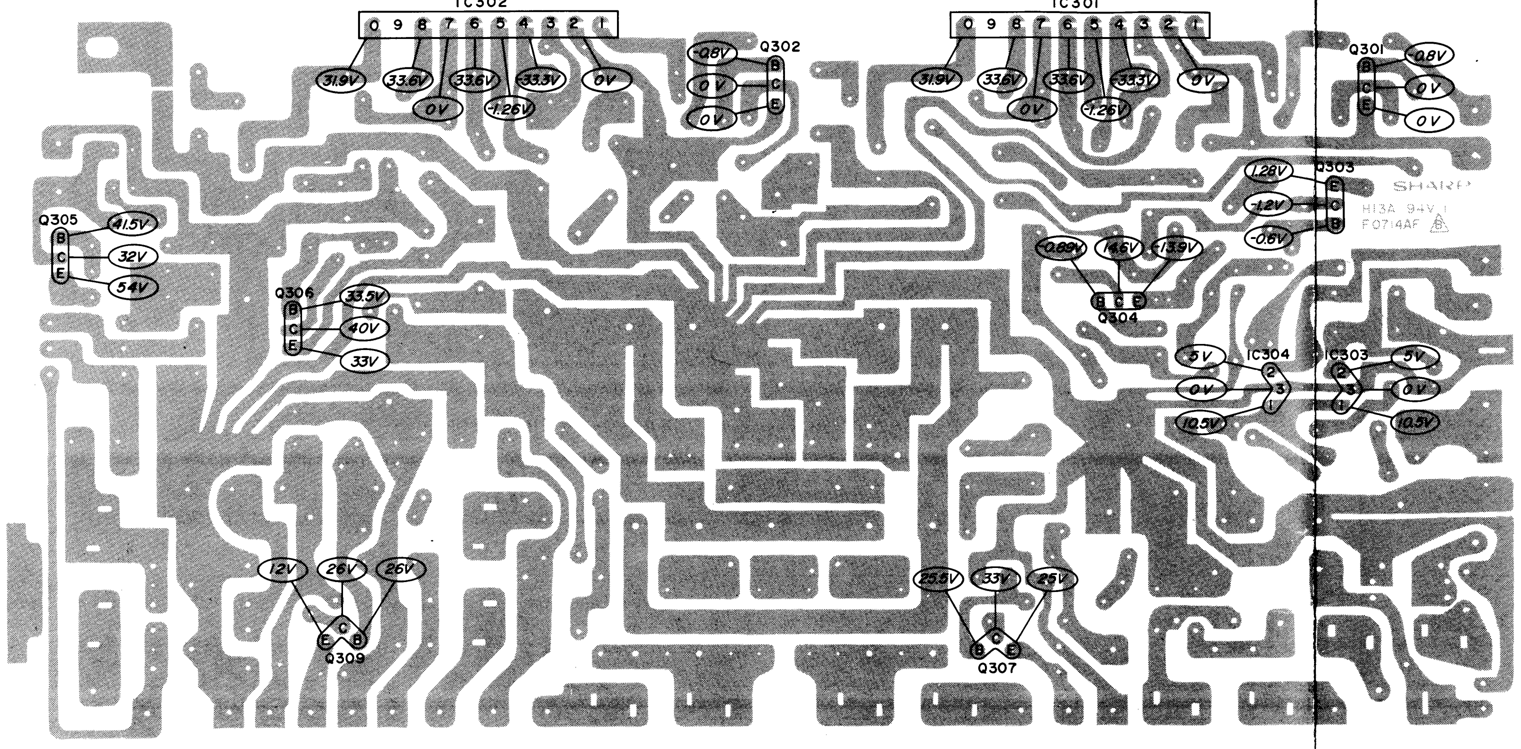
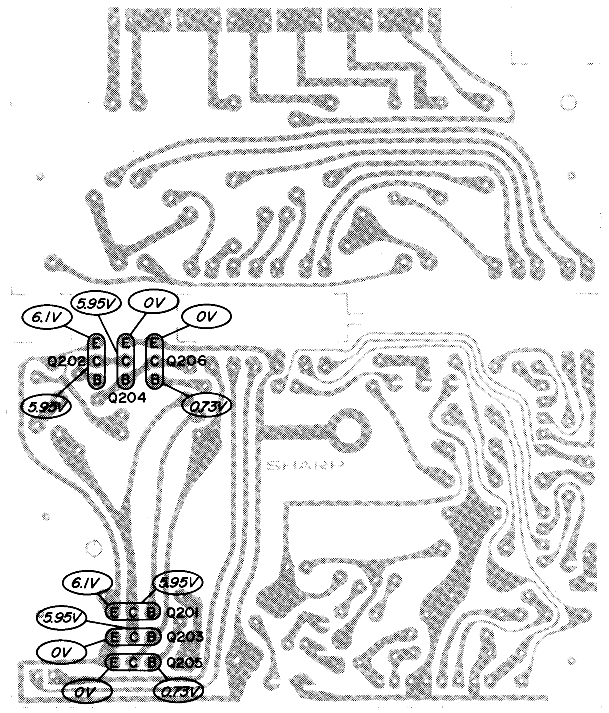

130 (45 rpm)
130 (33 rpm)
To PLAYER CONTROL P.W.B. CNP 906
CNS906
To CHASSIS GROUND
TO PLAYER MOTOR CONTROL P.W.B.
BLACK
WHITE
GRAY
YELLOW
BLUE
ORANGE
RED
BLACK
BLACK
BROWN
128 NEON LAMP
TO PLAYER MOTOR CONTROL P.W.B.
To POWER P.W.B. CNP302
CNS 302
YELLOW
BLACK
CNS902 TO PLAYER CONTROL P.W.B. CNP 902
YELLOW
ORANGE
RED
GRAY
BLACK
BLACK
RED
RED
109 MOTOR
114 EP/LP SELECTOR SOLENOID
115
116
118 MOTOR SWITCH
133 RECORD SIZE DETECTOR
CNS 901
CNS 903
TO SWITCH P.W.B. (SPEED SELECTOR)
YELLOW
BLACK
ORANGE
WHITE
GREEN
BROWN
BLUE
BLUE
PINK
VIOLET
ORANGE
ORANGE
BROWN
YELLOW
134 POWER SWITCH
GRAY
GREEN
GREEN
GREEN
WHITE
BLUE
WHITE
BLUE
TO PLAYER MOTOR CONTROL P.W.B.
RED
WHITE
WHITE
RED
RED
BLUE
BLUE
BROWN
BROWN
ORANGE
ORANGE
YELLOW
YELLOW
BLUE
BLUE
132 LAMP P.W.B. Ass'y
149 SENSOR Ass'y
GL513F
RT501A
VIOLET
PINK
BLUE
BROWN
ORANGE
RED
YELLOW
GREEN
BLACK
To PRE-AMP P.W.B. CNP 201
CNS 201
CARTRIDGE
D.D. MOTOR
WHITE
RED
GREEN
BLUE
WHITE
BLUE
GREEN
RED
BLACK
BLACK
To TONEARMS
To TONEARMS SHAFT
CNP 905
CNP 904
CNP 906
CNP 901
CNP 903
IC 910
RLY 901
Q1001 (TR1)
Q1002 (TR2)
Q1003 (TR3)
Q1004 (TR4)
IC1001
VR1001 (VR 1)
VR1002 (VR 2)
ZD1001
45 rpm
33 rpm
AUTO
MANUAL
SWITCH P.W.B.

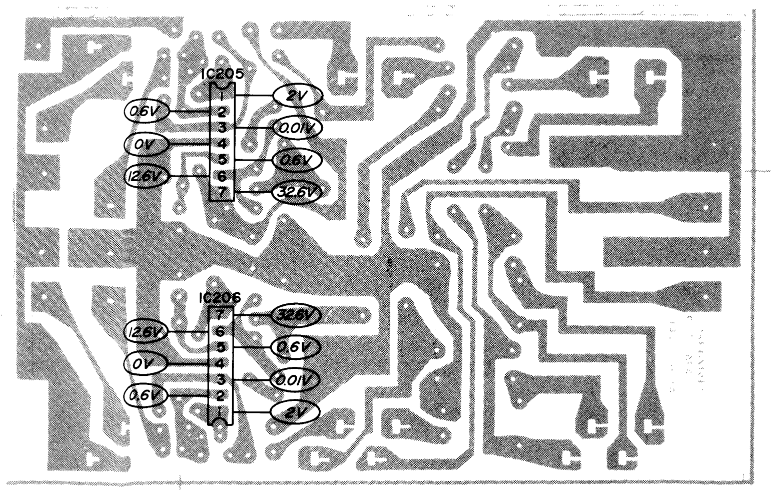
Figure 101–1 WIRING SIDE OF P.W. BOARD (Player Control/Arm Return Sensor)


IC302
IC301
Q302
Q301
Q303
Q304
Q305
Q306
Q307
Q309
IC304
IC303
31.9V
33.6V
-33.3V
-1.26V
0V
41.5V
32V
54V
33.5V
40V
33V
12V
26V
25.5V
33V
5V
10.5V
SHARP
H13A 94V-1
F0714AF

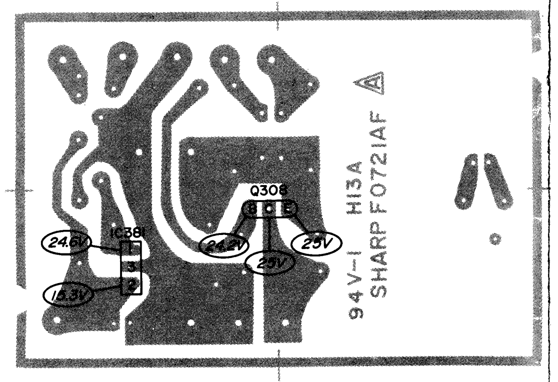
POWER


Q202
Q204
Q206
Q201
Q203
Q205
6.1V
5.95V
0V
0.73V
SHARP

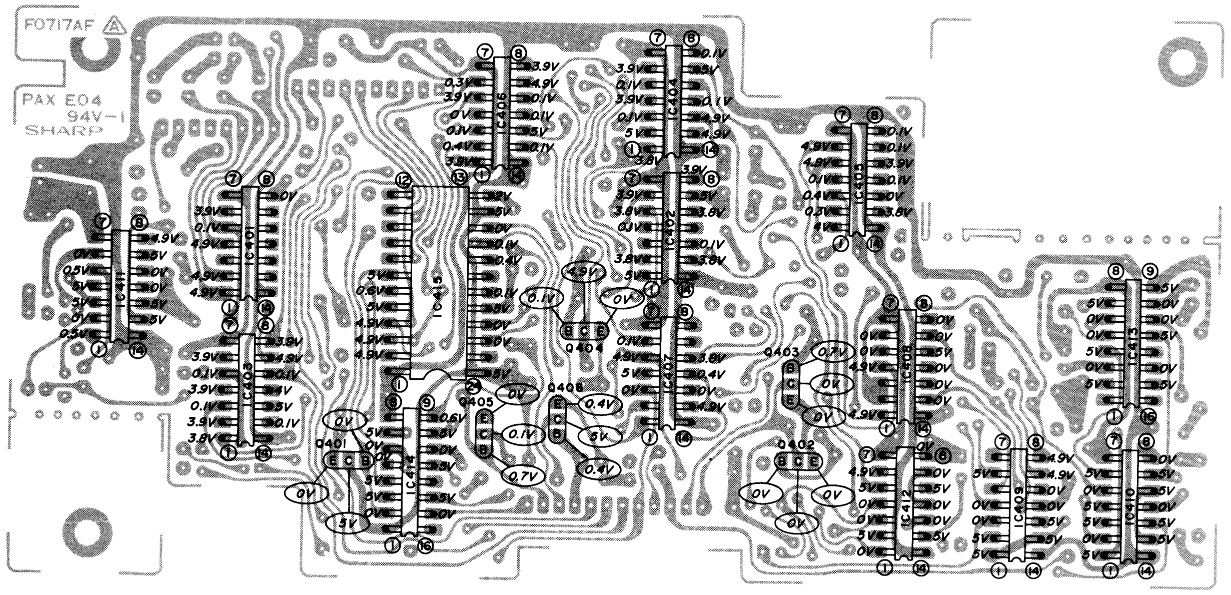
VOLUME CONTROL


IC205
IC206
2V
0.6V
0.01V
0V
12.6V
32.6V

TONE

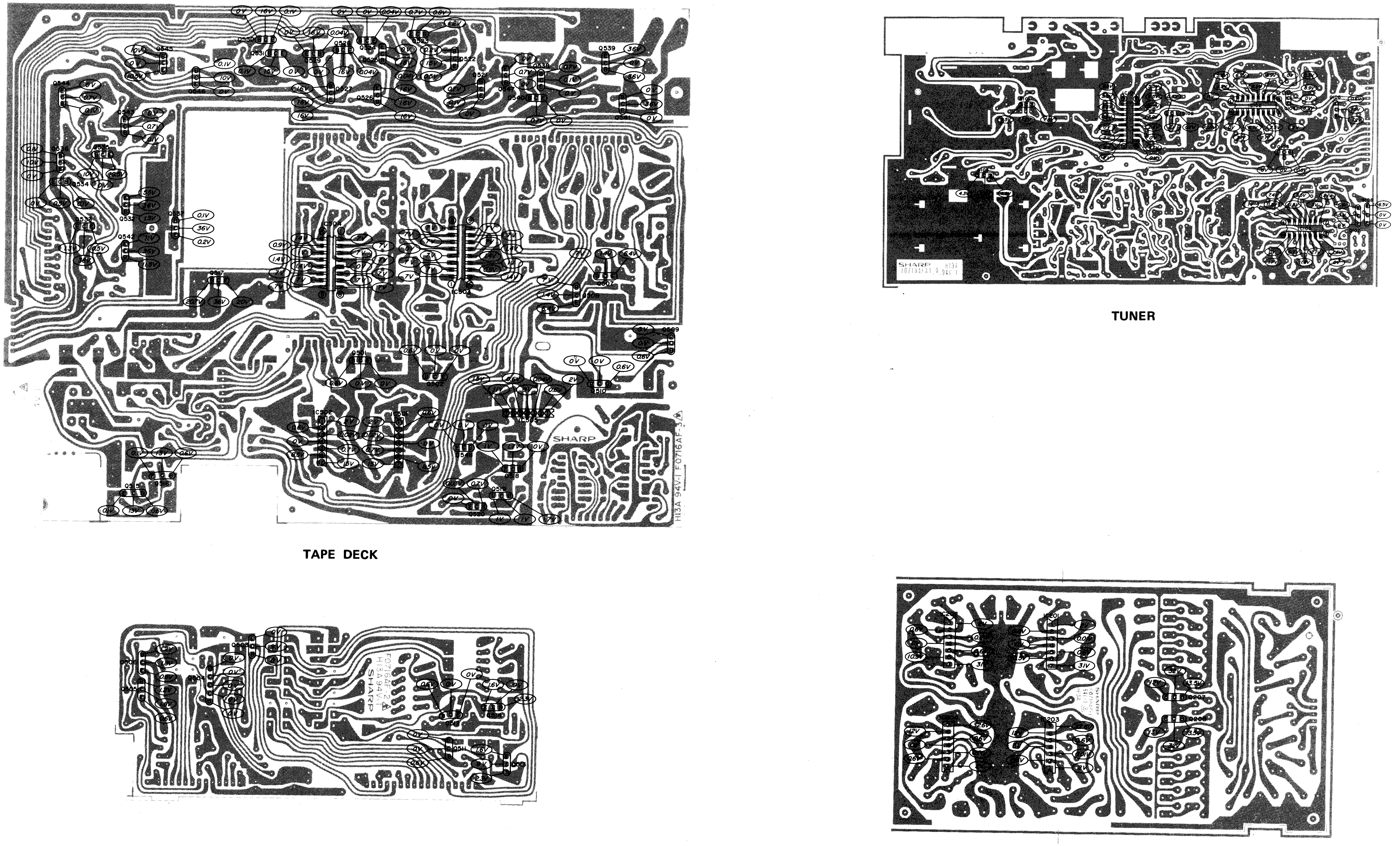

Q308
IC381
24.6V
12.3V
24.2V
25V
H13A
SHARP F0721AF
94V-1

SUB POWER


F0717AF
PAX E04
94V-1
SHARP
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC408
IC409
IC410
IC411
IC412
IC413
IC414
Q401
Q402
Q403
Q404
Q405
Q406

TAPE DECK LOGIC

Figure 103–1 VOLTAGE GUIDE OF P.W. BOARD (Power/Sub-Power/Volume Control/Tone/Tape Deck Logic)


SHARP
H13A 94V-1 F0716AF-3
F0716AF-2
H13A 94V-1
SHARP

TAPE DECK

TUNER

PRE-AMP.

Figure 105–1 VOLTAGE GUIDE OF P.W. BOARD (Tape Deck/Tuner/Pre-Amp.)

TROUBLE SHOOTING GUIDĖ

- Check for the following when servicing the SG-500H.
  1) Check whether voltage supply to the section (in trouble) is normal.
  2) Check if there is normal connection (socket and plug) among the sections.
  3) Check whether voltage supply to the IC and transistor of the section (in trouble) is normal.
  4) Check that the desired function has been selected.
  5) Check that the tape head is not stained.
  6) Check that at "TAPE" mode a tape is set at the holder in a proper way.
  7) Check that at "TAPE" mode a tape to be used for REC/PLAY operation is a recording-allowed one.
  8) Check that at "PHONO" mode a record disk is not deformed.
  9) Check whether at "PHONO" mode a record disk having the size other than 17 cm or 30 cm in diameter is used.
  10) Check that the fuses at each section are rated ones.

- For assuring a better Dolby NR effect, the parts concerned are specified in their errors as follows: check that they are normal ones at your servicing.

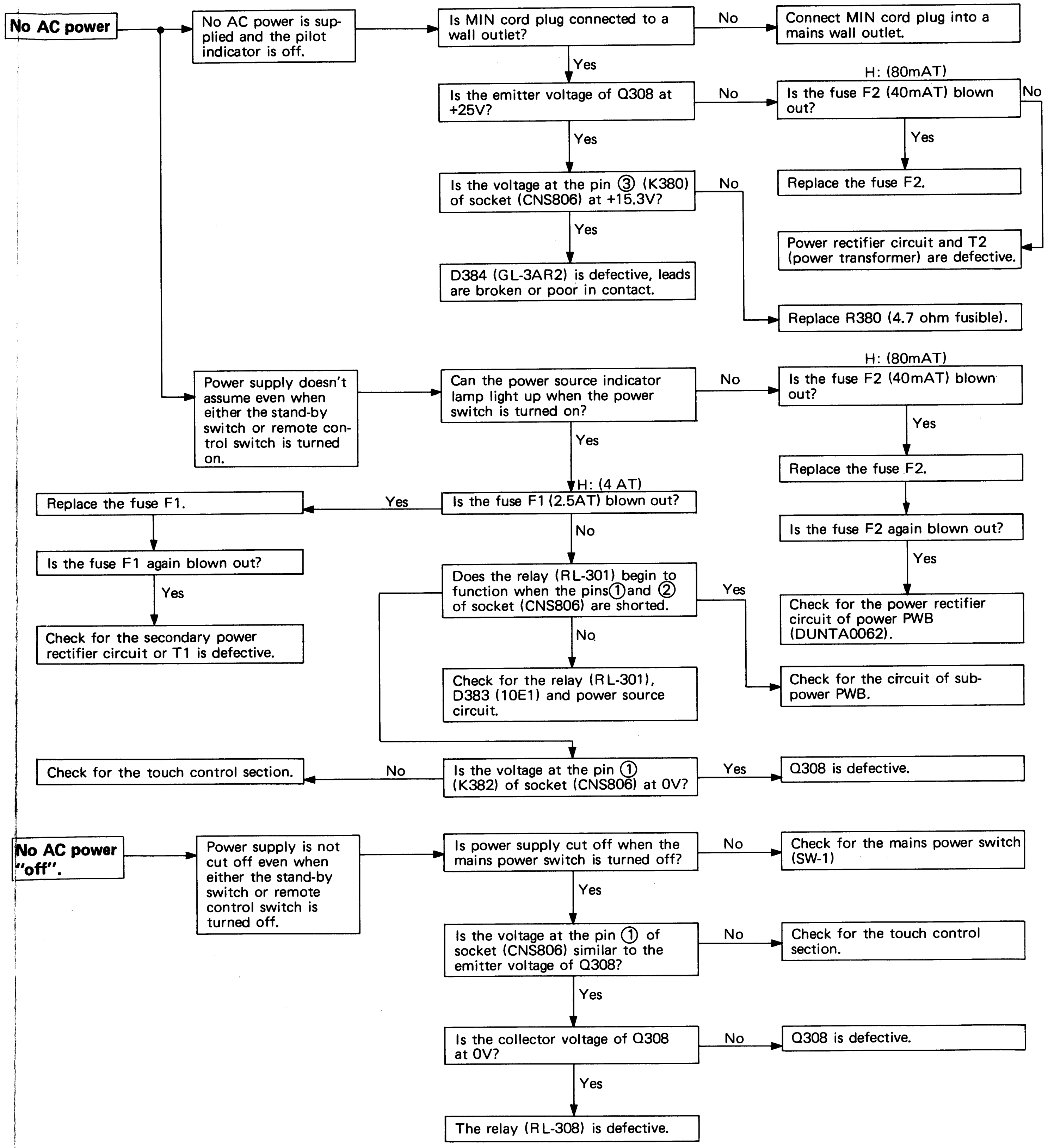
  - The parts used in the Dolby NR peripheral circuits must be within the following rating.
    a) Within an error of ±5%: R541 ~ 544, C531 ~ C534, C539 ~ C542, R549, R550, R547, R548
    b) Within an error of ±10%: C543 ~ C546 and all resistors

INDEX TO CONTENT

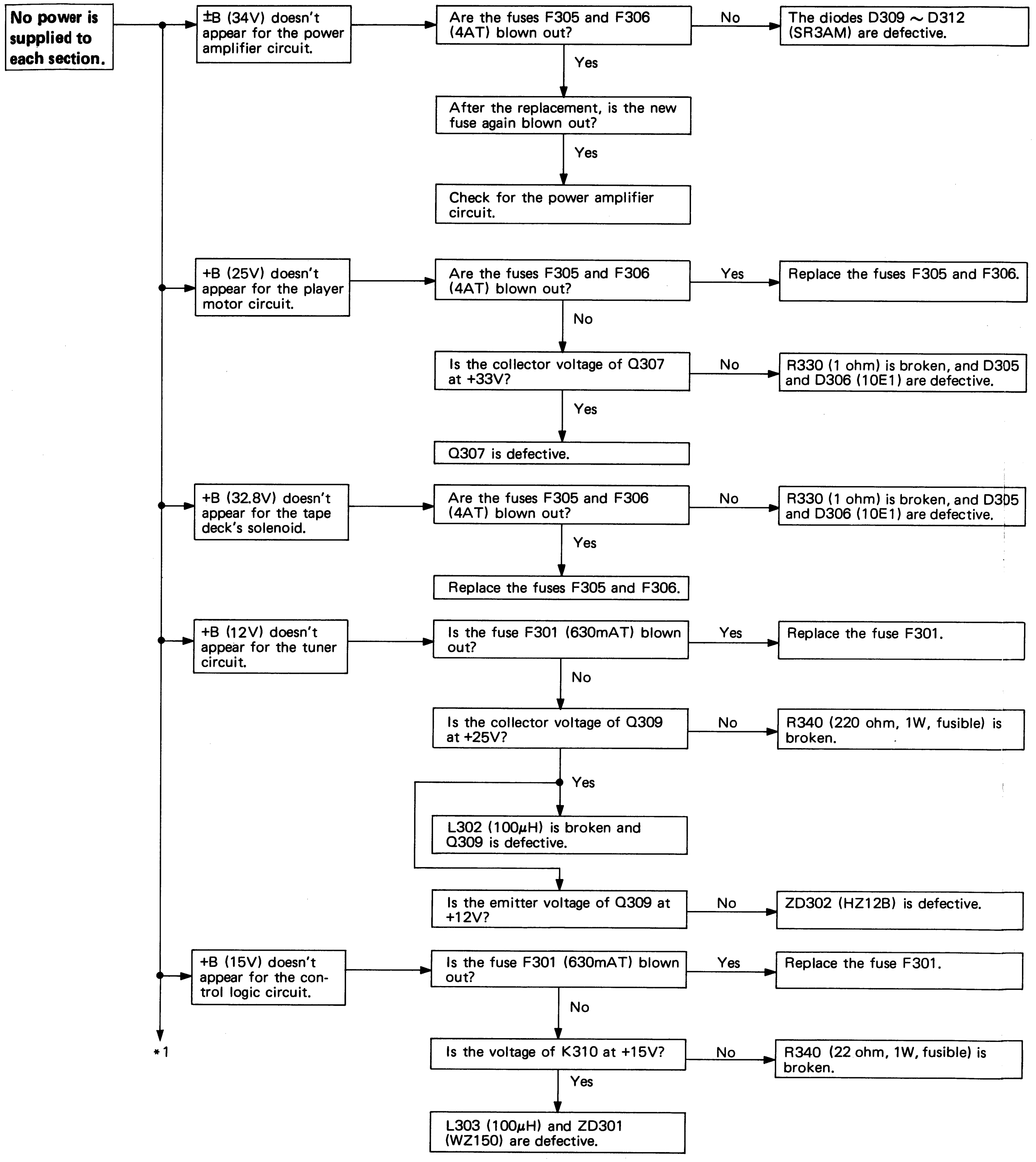
TROUBLE FLOW CHART 108–119
SIGNAL FLOW CHART 120–128
CONNECTION GUIDE 129–134

TROUBEL SHOOTING GUIDE

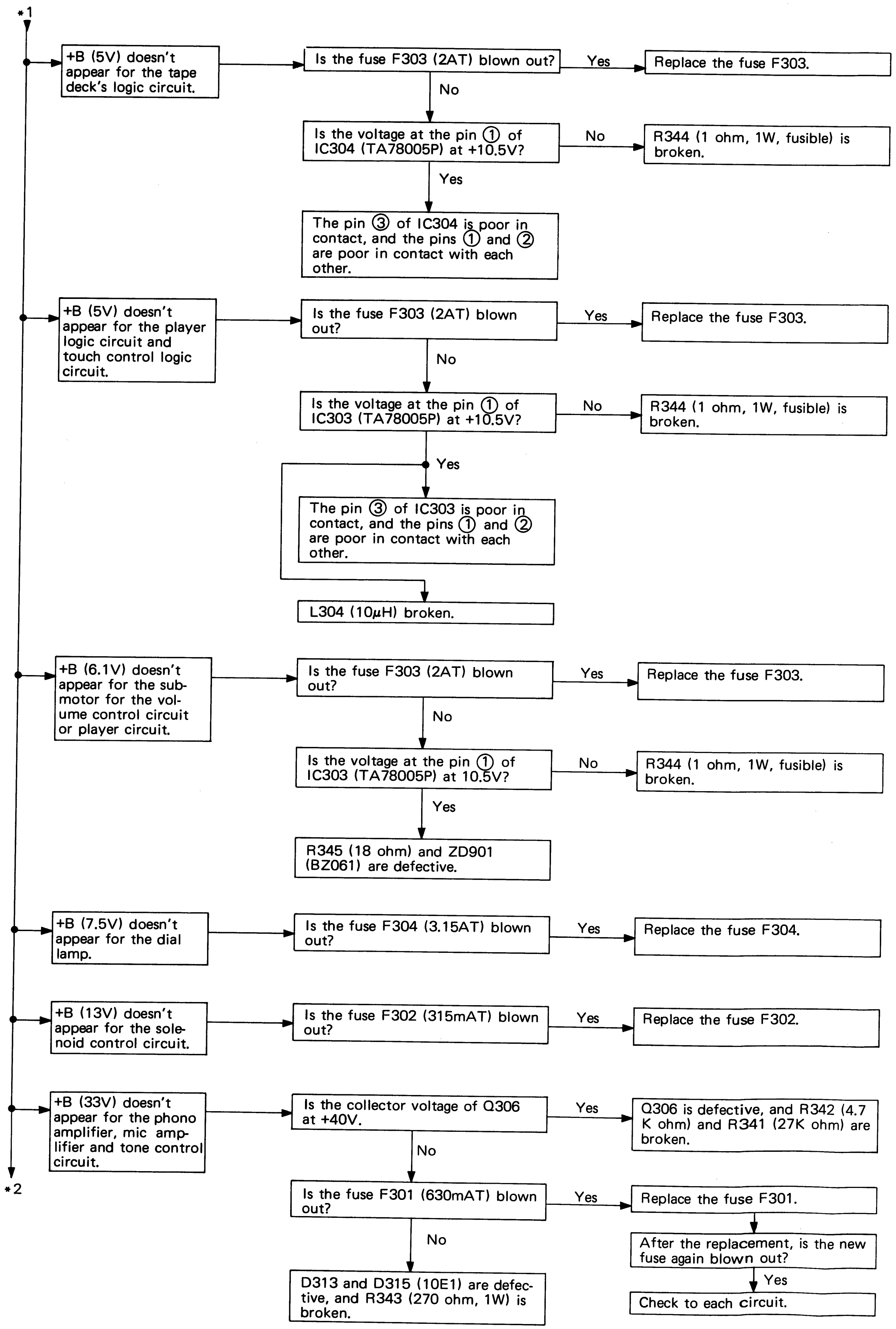
POWER SUPPLY CIRCUIT

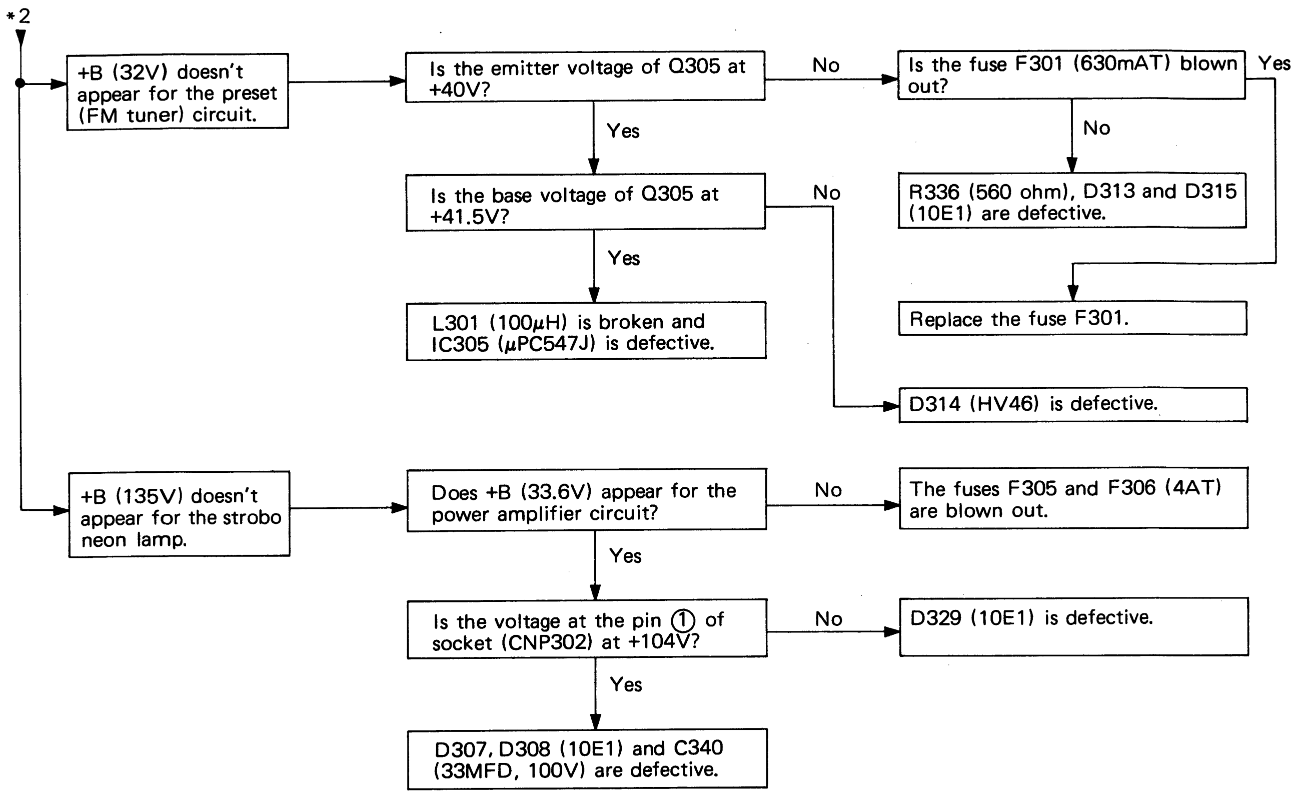

No AC power
No AC power is supplied and the pilot indicator is off.
Is MIN cord plug connected to a wall outlet?
No
Connect MIN cord plug into a mains wall outlet.
Yes
Is the emitter voltage of Q308 at +25V?
No
H: (80mAT)
Is the fuse F2 (40mAT) blown out?
No
Yes
Is the voltage at the pin ③ (K380) of socket (CNS806) at +15.3V?
No
Replace the fuse F2.
Yes
Power rectifier circuit and T2 (power transformer) are defective.
D384 (GL-3AR2) is defective, leads are broken or poor in contact.
Replace R380 (4.7 ohm fusible).
Power supply doesn't assume even when either the stand-by switch or remote control switch is turned on.
Can the power source indicator lamp light up when the power switch is turned on?
No
H: (80mAT)
Is the fuse F2 (40mAT) blown out?
Yes
Yes
Replace the fuse F2.
H: (4 AT)
Replace the fuse F1.
Yes
Is the fuse F1 (2.5AT) blown out?
Is the fuse F2 again blown out?
No
Yes
Is the fuse F1 again blown out?
Does the relay (RL-301) begin to function when the pins①and ② of socket (CNS806) are shorted.
Yes
Yes
Check for the power rectifier circuit of power PWB (DUNTA0062).
Check for the secondary power rectifier circuit or T1 is defective.
No
Check for the relay (RL-301), D383 (10E1) and power source circuit.
Check for the circuit of sub-power PWB.
Check for the touch control section.
No
Is the voltage at the pin ① (K382) of socket (CNS806) at 0V?
Yes
Q308 is defective.
No AC power "off".
Power supply is not cut off even when either the stand-by switch or remote control switch is turned off.
Is power supply cut off when the mains power switch is turned off?
No
Check for the mains power switch (SW-1)
Yes
Is the voltage at the pin ① of socket (CNS806) similar to the emitter voltage of Q308?
No
Check for the touch control section.
Yes
Is the collector voltage of Q308 at 0V?
No
Q308 is defective.
Yes
The relay (RL-308) is defective.

TROUBLE SHOOTING GUIDE

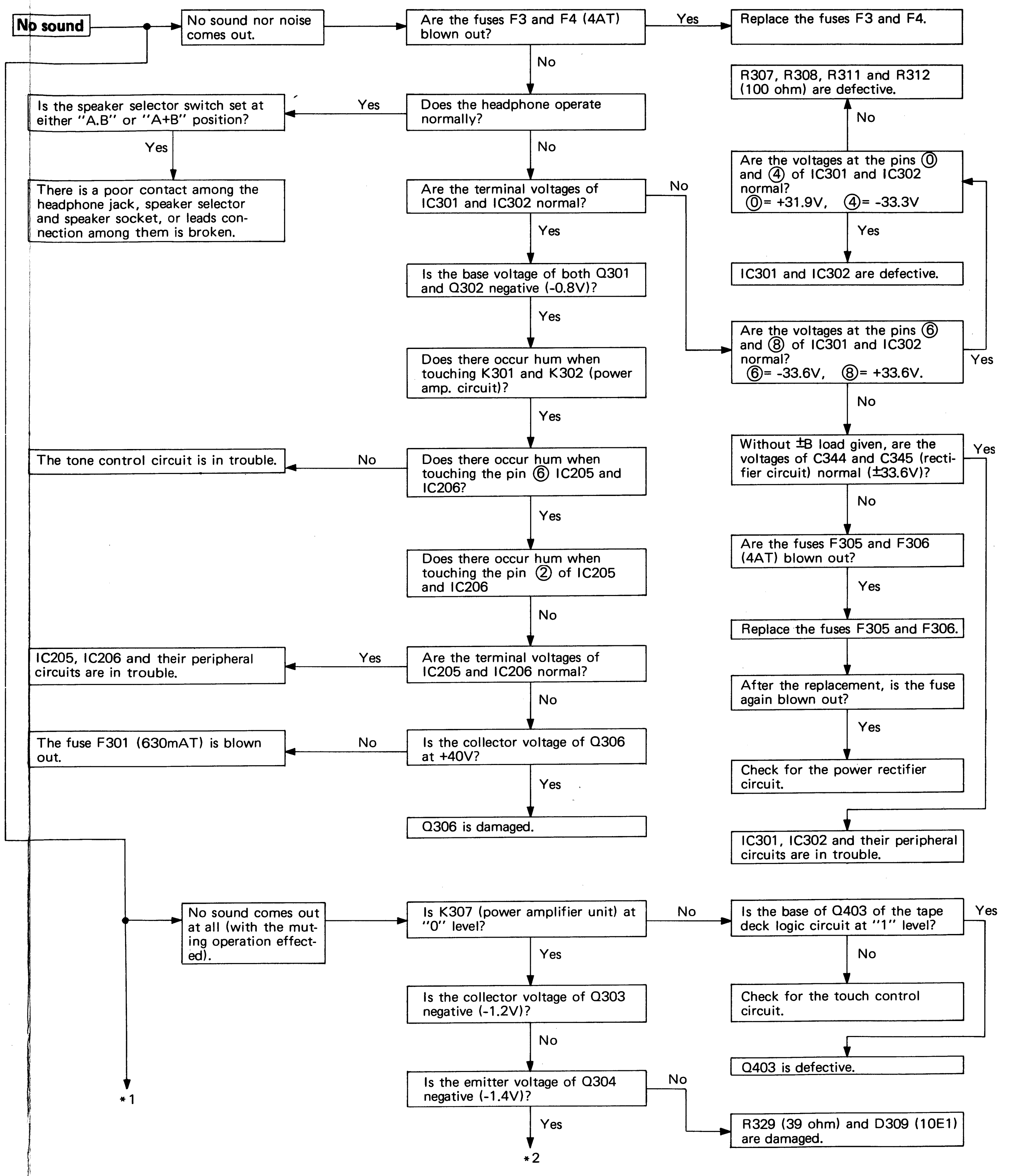

No power is supplied to each section.
±B (34V) doesn't appear for the power amplifier circuit.
Are the fuses F305 and F306 (4AT) blown out?
No
The diodes D309 ~ D312 (SR3AM) are defective.
Yes
After the replacement, is the new fuse again blown out?
Yes
Check for the power amplifier circuit.
+B (25V) doesn't appear for the player motor circuit.
Are the fuses F305 and F306 (4AT) blown out?
Yes
Replace the fuses F305 and F306.
No
Is the collector voltage of Q307 at +33V?
No
R330 (1 ohm) is broken, and D305 and D306 (10E1) are defective.
Yes
Q307 is defective.
+B (32.8V) doesn't appear for the tape deck's solenoid.
Are the fuses F305 and F306 (4AT) blown out?
No
R330 (1 ohm) is broken, and D305 and D306 (10E1) are defective.
Yes
Replace the fuses F305 and F306.
+B (12V) doesn't appear for the tuner circuit.
Is the fuse F301 (630mAT) blown out?
Yes
Replace the fuse F301.
No
Is the collector voltage of Q309 at +25V?
No
R340 (220 ohm, 1W, fusible) is broken.
Yes
L302 (100μH) is broken and Q309 is defective.
Is the emitter voltage of Q309 at +12V?
No
ZD302 (HZ12B) is defective.
+B (15V) doesn't appear for the control logic circuit.
Is the fuse F301 (630mAT) blown out?
Yes
Replace the fuse F301.
No
Is the voltage of K310 at +15V?
No
R340 (22 ohm, 1W, fusible) is broken.
Yes
L303 (100μH) and ZD301 (WZ150) are defective.
*1

TROUBLE SHOOTING GUIDE

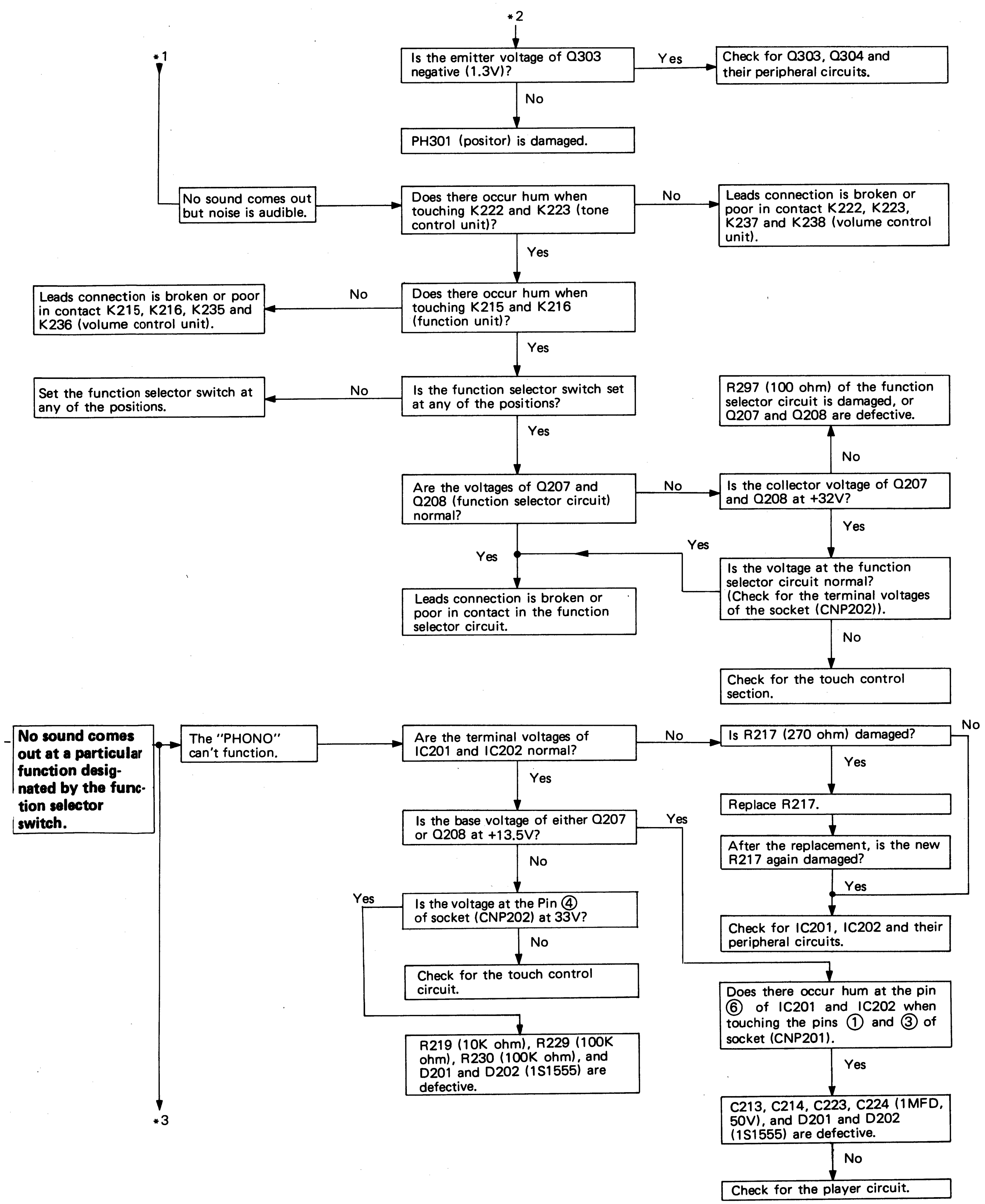

*1
+B (5V) doesn't appear for the tape deck's logic circuit.
Is the fuse F303 (2AT) blown out?
Yes
Replace the fuse F303.
No
Is the voltage at the pin ① of IC304 (TA78005P) at +10.5V?
No
R344 (1 ohm, 1W, fusible) is broken.
Yes
The pin ③ of IC304 is poor in contact, and the pins ① and ② are poor in contact with each other.
+B (5V) doesn't appear for the player logic circuit and touch control logic circuit.
Is the fuse F303 (2AT) blown out?
Yes
Replace the fuse F303.
No
Is the voltage at the pin ① of IC303 (TA78005P) at +10.5V?
No
R344 (1 ohm, 1W, fusible) is broken.
Yes
The pin ③ of IC303 is poor in contact, and the pins ① and ② are poor in contact with each other.
L304 (10μH) broken.
+B (6.1V) doesn't appear for the sub-motor for the volume control circuit or player circuit.
Is the fuse F303 (2AT) blown out?
Yes
Replace the fuse F303.
No
Is the voltage at the pin ① of IC303 (TA78005P) at 10.5V?
No
R344 (1 ohm, 1W, fusible) is broken.
Yes
R345 (18 ohm) and ZD901 (BZ061) are defective.
+B (7.5V) doesn't appear for the dial lamp.
Is the fuse F304 (3.15AT) blown out?
Yes
Replace the fuse F304.
+B (13V) doesn't appear for the solenoid control circuit.
Is the fuse F302 (315mAT) blown out?
Yes
Replace the fuse F302.
+B (33V) doesn't appear for the phono amplifier, mic amplifier and tone control circuit.
Is the collector voltage of Q306 at +40V.
Yes
Q306 is defective, and R342 (4.7 K ohm) and R341 (27K ohm) are broken.
No
Is the fuse F301 (630mAT) blown out?
Yes
Replace the fuse F301.
After the replacement, is the new fuse again blown out?
Yes
Check to each circuit.
No
D313 and D315 (10E1) are defective, and R343 (270 ohm, 1W) is broken.
*2


*2
+B (32V) doesn't appear for the preset (FM tuner) circuit.
Is the emitter voltage of Q305 at +40V?
No
Is the fuse F301 (630mAT) blown out?
Yes
No
R336 (560 ohm), D313 and D315 (10E1) are defective.
Replace the fuse F301.
Yes
Is the base voltage of Q305 at +41.5V?
No
D314 (HV46) is defective.
Yes
L301 (100μH) is broken and IC305 (μPC547J) is defective.
+B (135V) doesn't appear for the strobo neon lamp.
Does +B (33.6V) appear for the power amplifier circuit?
No
The fuses F305 and F306 (4AT) are blown out.
Yes
Is the voltage at the pin ① of socket (CNP302) at +104V?
No
D329 (10E1) is defective.
Yes
D307, D308 (10E1) and C340 (33MFD, 100V) are defective.

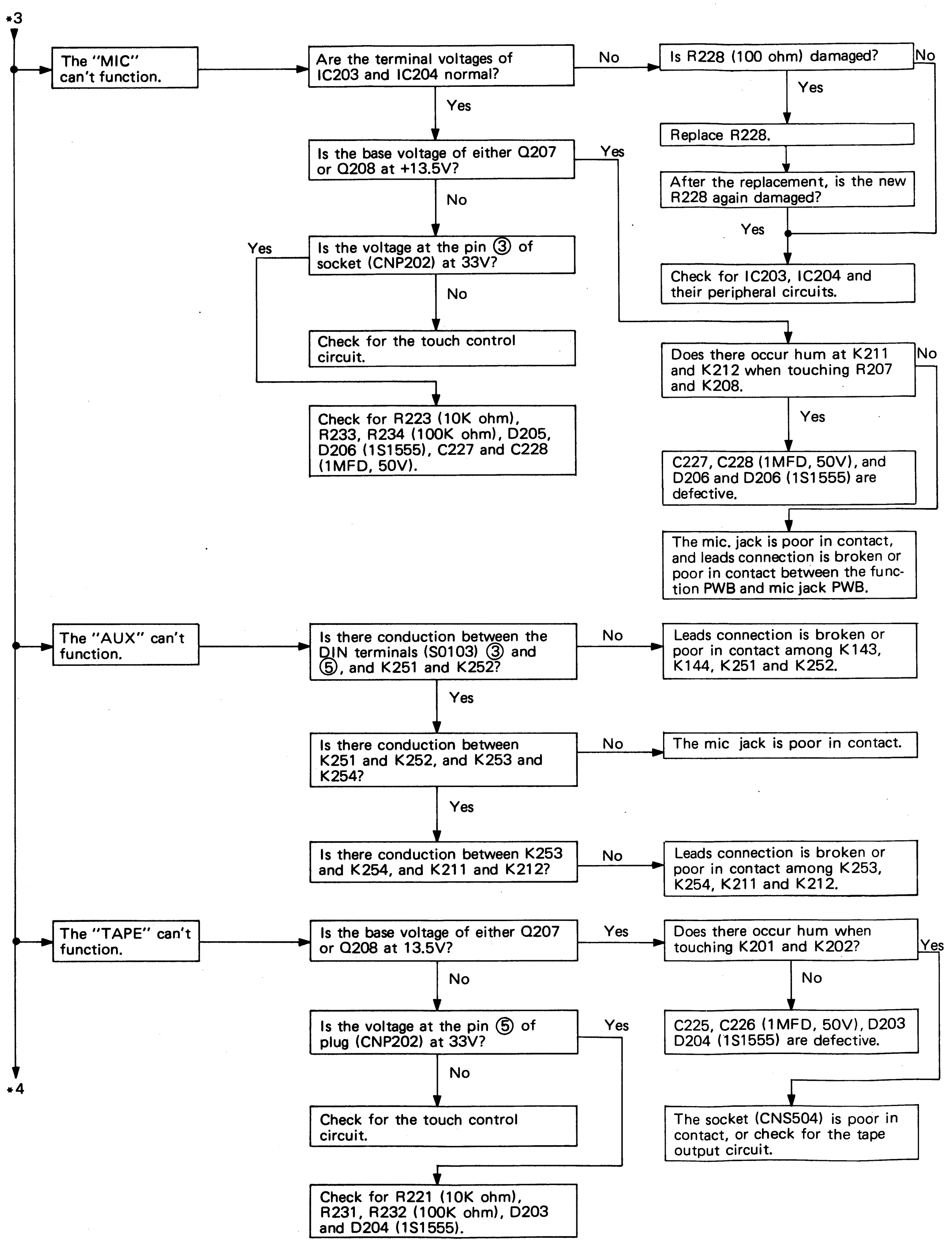
AUDIO CIRCUIT


No sound
No sound nor noise comes out.
Are the fuses F3 and F4 (4AT) blown out?
Yes
Replace the fuses F3 and F4.
No
Does the headphone operate normally?
Yes
Is the speaker selector switch set at either "A.B" or "A+B" position?
Yes
There is a poor contact among the headphone jack, speaker selector and speaker socket, or leads connection among them is broken.
No
Are the terminal voltages of IC301 and IC302 normal?
No
Are the voltages at the pins ⑥ and ⑧ of IC301 and IC302 normal? ⑥= -33.6V, ⑧= +33.6V.
Yes
Are the voltages at the pins ⓪ and ④ of IC301 and IC302 normal? ⓪= +31.9V, ④= -33.3V
No
R307, R308, R311 and R312 (100 ohm) are defective.
Yes
IC301 and IC302 are defective.
No
Without ±B load given, are the voltages of C344 and C345 (rectifier circuit) normal (±33.6V)?
Yes
No
Are the fuses F305 and F306 (4AT) blown out?
Yes
Replace the fuses F305 and F306.
After the replacement, is the fuse again blown out?
Yes
Check for the power rectifier circuit.
IC301, IC302 and their peripheral circuits are in trouble.
Yes
Is the base voltage of both Q301 and Q302 negative (-0.8V)?
Yes
Does there occur hum when touching K301 and K302 (power amp. circuit)?
Yes
Does there occur hum when touching the pin ⑥ IC205 and IC206?
No
The tone control circuit is in trouble.
Yes
Does there occur hum when touching the pin ② of IC205 and IC206
No
Are the terminal voltages of IC205 and IC206 normal?
Yes
IC205, IC206 and their peripheral circuits are in trouble.
No
Is the collector voltage of Q306 at +40V?
No
The fuse F301 (630mAT) is blown out.
Yes
Q306 is damaged.
No sound comes out at all (with the muting operation effected).
Is K307 (power amplifier unit) at "0" level?
No
Is the base of Q403 of the tape deck logic circuit at "1" level?
Yes
No
Check for the touch control circuit.
Q403 is defective.
Yes
Is the collector voltage of Q303 negative (-1.2V)?
No
Is the emitter voltage of Q304 negative (-1.4V)?
No
R329 (39 ohm) and D309 (10E1) are damaged.
Yes
*2
*1

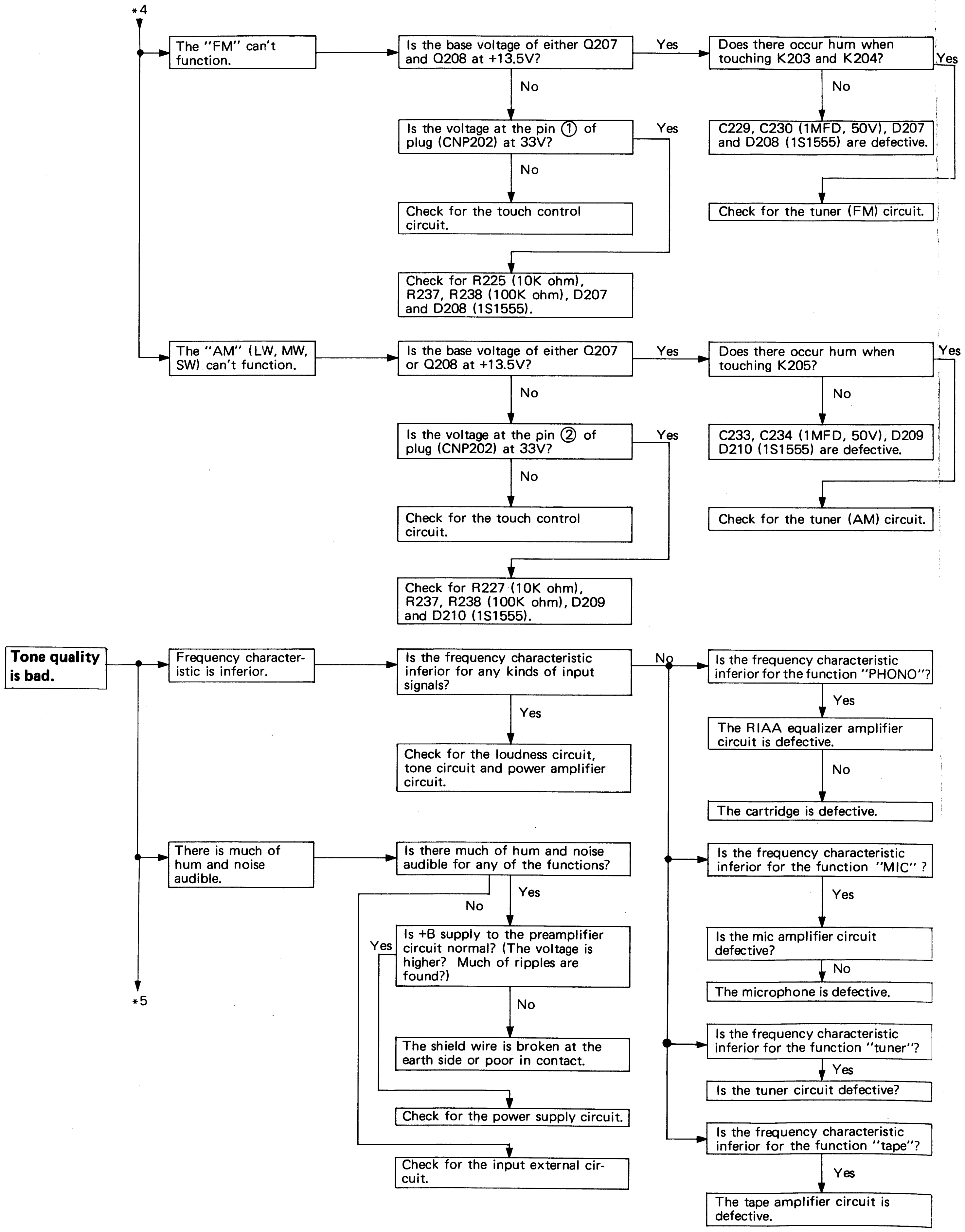
TROUBLE SHOOTING GUIDE


*2
Is the emitter voltage of Q303 negative (1.3V)?
Yes
Check for Q303, Q304 and their peripheral circuits.
No
PH301 (positor) is damaged.
*1
No sound comes out but noise is audible.
Does there occur hum when touching K222 and K223 (tone control unit)?
No
Leads connection is broken or poor in contact K222, K223, K237 and K238 (volume control unit).
Yes
Does there occur hum when touching K215 and K216 (function unit)?
No
Leads connection is broken or poor in contact K215, K216, K235 and K236 (volume control unit).
Yes
Is the function selector switch set at any of the positions?
No
Set the function selector switch at any of the positions.
Yes
R297 (100 ohm) of the function selector circuit is damaged, or Q207 and Q208 are defective.
No
Are the voltages of Q207 and Q208 (function selector circuit) normal?
No
Is the collector voltage of Q207 and Q208 at +32V?
Yes
Yes
Yes
Is the voltage at the function selector circuit normal? (Check for the terminal voltages of the socket (CNP202)).
Leads connection is broken or poor in contact in the function selector circuit.
No
Check for the touch control section.
No sound comes out at a particular function designated by the function selector switch.
The "PHONO" can't function.
Are the terminal voltages of IC201 and IC202 normal?
No
Is R217 (270 ohm) damaged?
No
Yes
Replace R217.
After the replacement, is the new R217 again damaged?
Yes
Check for IC201, IC202 and their peripheral circuits.
Yes
Is the base voltage of either Q207 or Q208 at +13.5V?
Yes
No
Yes
Is the voltage at the Pin ④ of socket (CNP202) at 33V?
No
Check for the touch control circuit.
R219 (10K ohm), R229 (100K ohm), R230 (100K ohm), and D201 and D202 (1S1555) are defective.
Does there occur hum at the pin ⑥ of IC201 and IC202 when touching the pins ① and ③ of socket (CNP201).
Yes
C213, C214, C223, C224 (1MFD, 50V), and D201 and D202 (1S1555) are defective.
No
Check for the player circuit.
*3

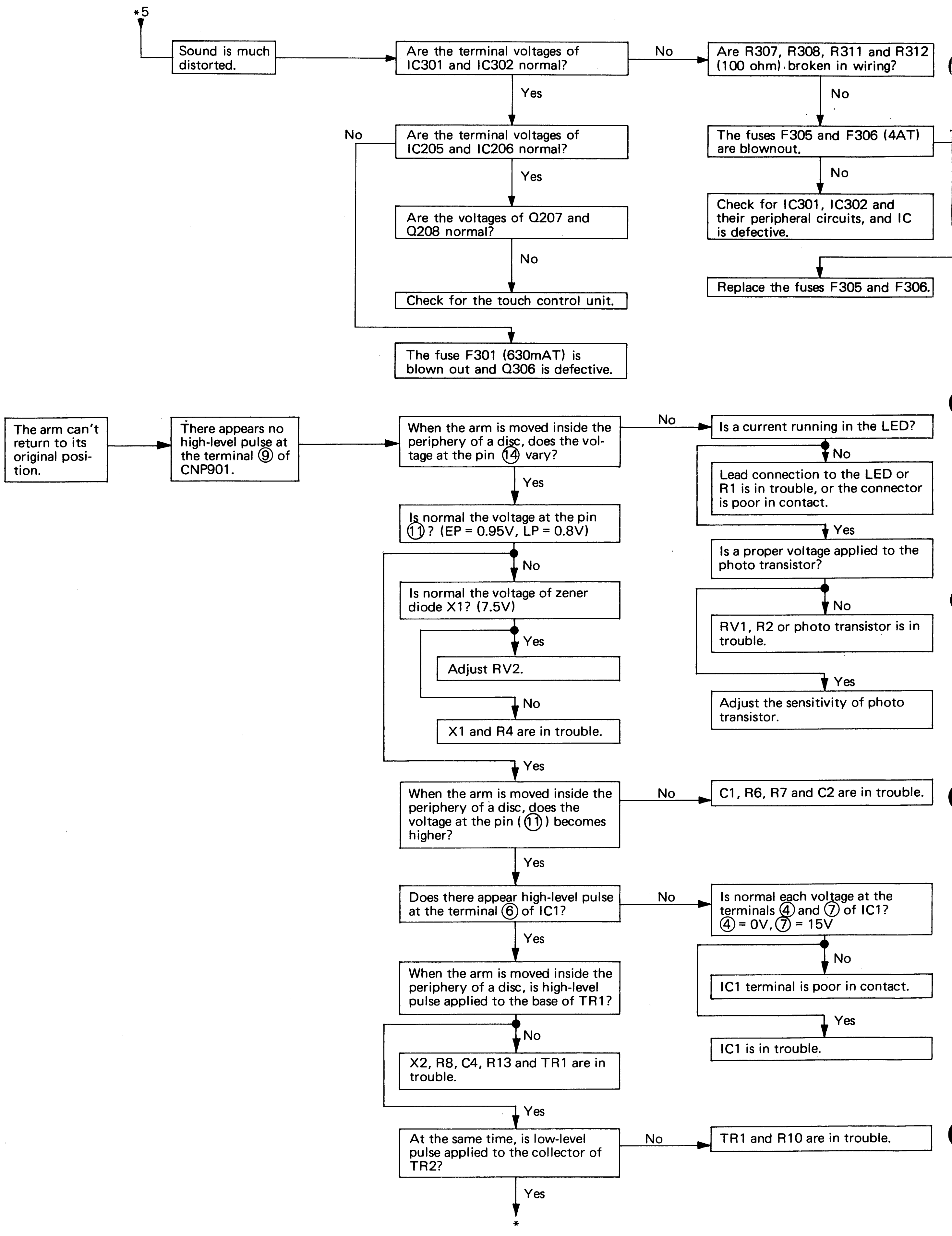
TROUBLE SHOOTING GUIDE


*3
The "MIC" can't function.
Are the terminal voltages of IC203 and IC204 normal?
No
Is R228 (100 ohm) damaged?
No
Yes
Replace R228.
After the replacement, is the new R228 again damaged?
Yes
Check for IC203, IC204 and their peripheral circuits.
Yes
Is the base voltage of either Q207 or Q208 at +13.5V?
Yes
No
Yes
Is the voltage at the pin ③ of socket (CNP202) at 33V?
No
Check for the touch control circuit.
Check for R223 (10K ohm), R233, R234 (100K ohm), D205, D206 (1S1555), C227 and C228 (1MFD, 50V).
Does there occur hum at K211 and K212 when touching R207 and K208.
No
Yes
C227, C228 (1MFD, 50V), and D206 and D206 (1S1555) are defective.
The mic. jack is poor in contact, and leads connection is broken or poor in contact between the function PWB and mic jack PWB.
The "AUX" can't function.
Is there conduction between the DIN terminals (S0103) ③ and ⑤, and K251 and K252?
No
Leads connection is broken or poor in contact among K143, K144, K251 and K252.
Yes
Is there conduction between K251 and K252, and K253 and K254?
No
The mic jack is poor in contact.
Yes
Is there conduction between K253 and K254, and K211 and K212?
No
Leads connection is broken or poor in contact among K253, K254, K211 and K212.
The "TAPE" can't function.
Is the base voltage of either Q207 or Q208 at 13.5V?
Yes
Does there occur hum when touching K201 and K202?
Yes
No
Is the voltage at the pin ⑤ of plug (CNP202) at 33V?
Yes
No
C225, C226 (1MFD, 50V), D203 D204 (1S1555) are defective.
No
Check for the touch control circuit.
The socket (CNS504) is poor in contact, or check for the tape output circuit.
Check for R221 (10K ohm), R231, R232 (100K ohm), D203 and D204 (1S1555).
*4

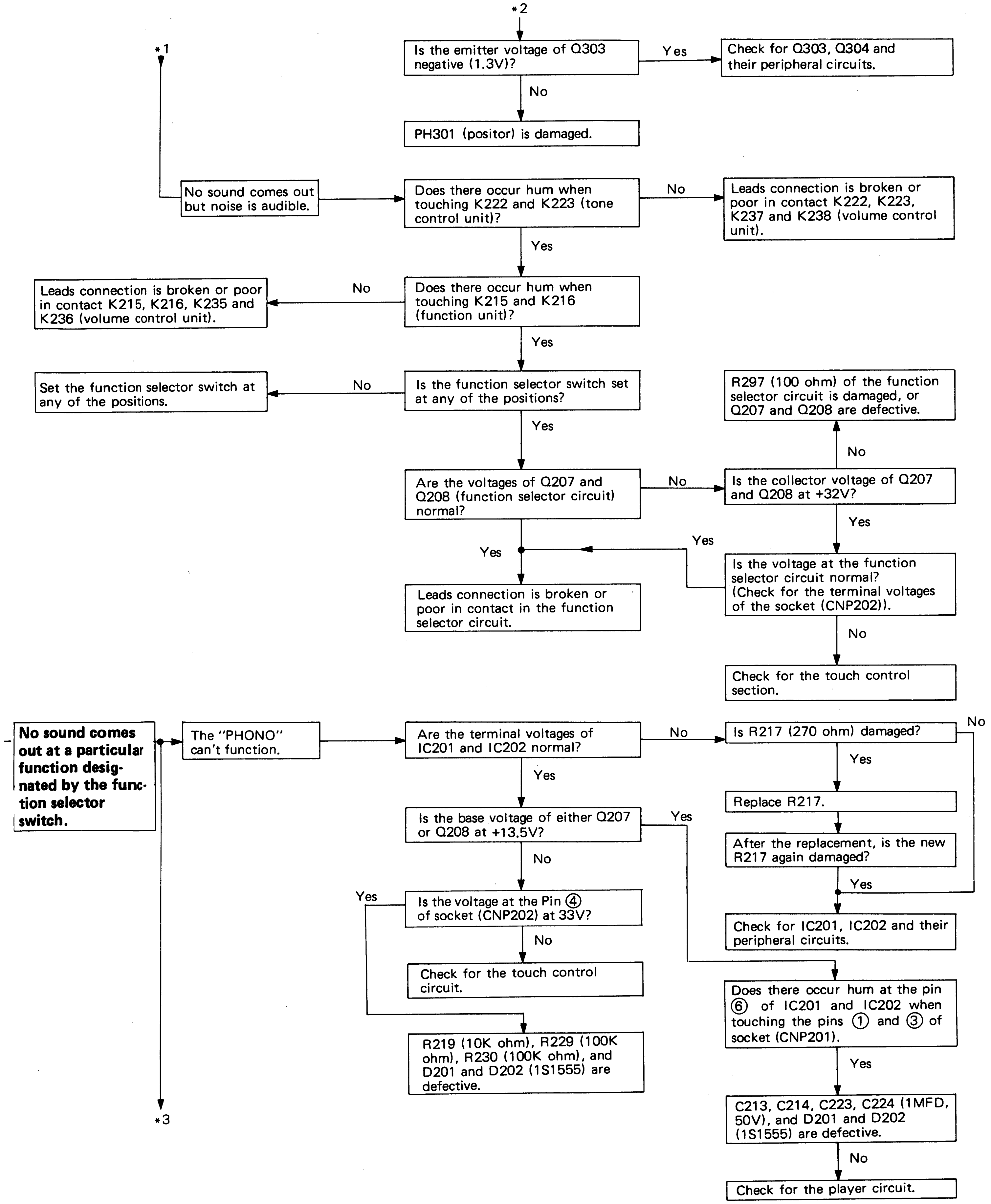
TROUBLE SHOOTING GUIDE


*4
The "FM" can't function.
Is the base voltage of either Q207 and Q208 at +13.5V?
Yes
Does there occur hum when touching K203 and K204?
Yes
No
No
Is the voltage at the pin ① of plug (CNP202) at 33V?
Yes
C229, C230 (1MFD, 50V), D207 and D208 (1S1555) are defective.
No
Check for the touch control circuit.
Check for the tuner (FM) circuit.
Check for R225 (10K ohm), R237, R238 (100K ohm), D207 and D208 (1S1555).
The "AM" (LW, MW, SW) can't function.
Is the base voltage of either Q207 or Q208 at +13.5V?
Yes
Does there occur hum when touching K205?
Yes
No
No
Is the voltage at the pin ② of plug (CNP202) at 33V?
Yes
C233, C234 (1MFD, 50V), D209 D210 (1S1555) are defective.
No
Check for the touch control circuit.
Check for the tuner (AM) circuit.
Check for R227 (10K ohm), R237, R238 (100K ohm), D209 and D210 (1S1555).
Tone quality is bad.
Frequency characteristic is inferior.
Is the frequency characteristic inferior for any kinds of input signals?
No
Is the frequency characteristic inferior for the function "PHONO"?
Yes
Yes
Check for the loudness circuit, tone circuit and power amplifier circuit.
The RIAA equalizer amplifier circuit is defective.
No
The cartridge is defective.
There is much of hum and noise audible.
Is there much of hum and noise audible for any of the functions?
Is the frequency characteristic inferior for the function "MIC" ?
Yes
No
Yes
Yes
Is +B supply to the preamplifier circuit normal? (The voltage is higher? Much of ripples are found?)
Is the mic amplifier circuit defective?
No
The microphone is defective.
No
The shield wire is broken at the earth side or poor in contact.
Is the frequency characteristic inferior for the function "tuner"?
Yes
Is the tuner circuit defective?
Check for the power supply circuit.
Is the frequency characteristic inferior for the function "tape"?
Check for the input external circuit.
Yes
The tape amplifier circuit is defective.
*5

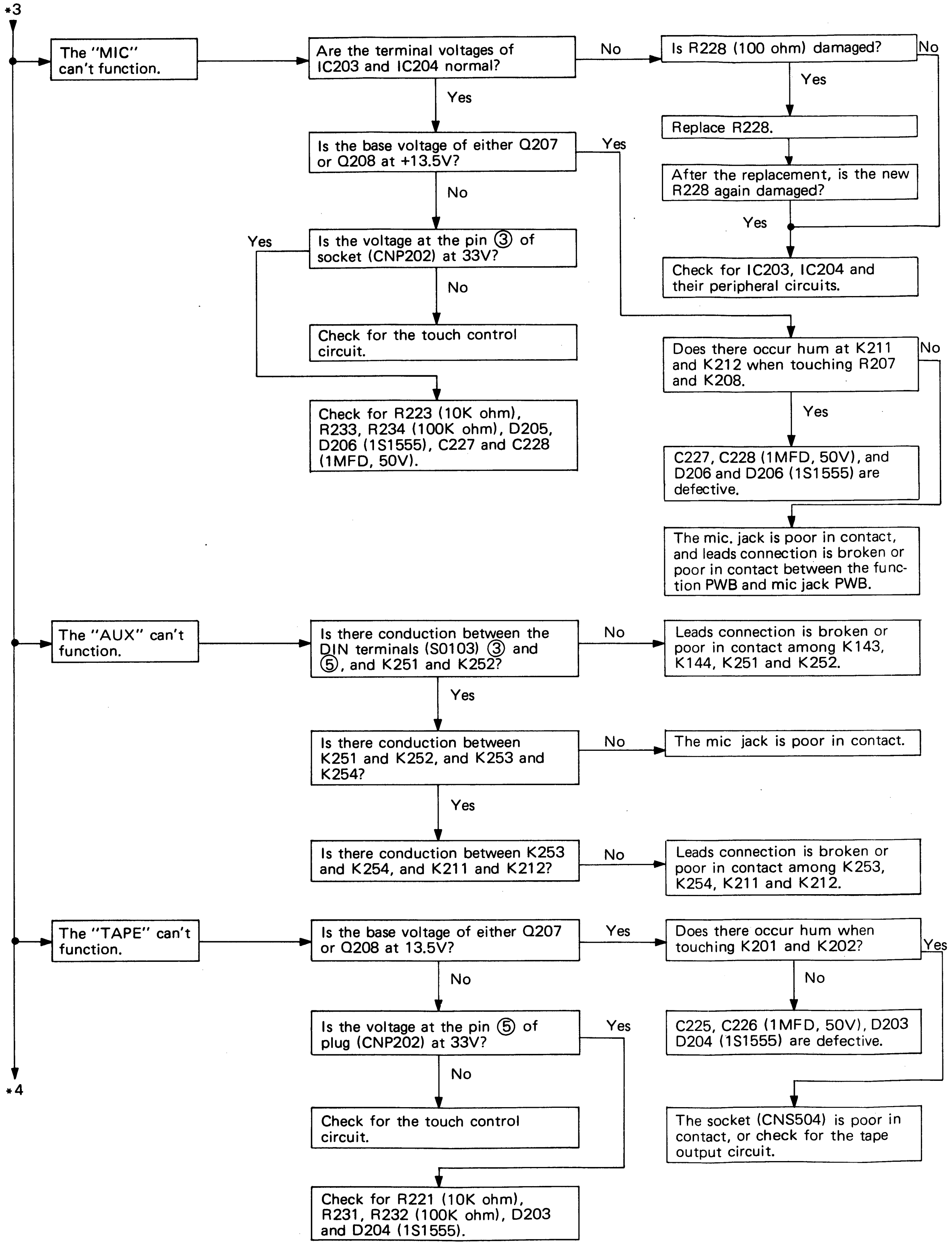
TROUBLE SHOOTING GUIDE


*5
Sound is much distorted.
Are the terminal voltages of IC301 and IC302 normal?
No
Are R307, R308, R311 and R312 (100 ohm) broken in wiring?
Yes
No
No
Are the terminal voltages of IC205 and IC206 normal?
The fuses F305 and F306 (4AT) are blownout.
Yes
No
Are the voltages of Q207 and Q208 normal?
Check for IC301, IC302 and their peripheral circuits, and IC is defective.
No
Replace the fuses F305 and F306.
Check for the touch control unit.
The fuse F301 (630mAT) is blown out and Q306 is defective.
The arm can't return to its original position.
There appears no high-level pulse at the terminal ⑨ of CNP901.
When the arm is moved inside the periphery of a disc, does the voltage at the pin ⑭ vary?
No
Is a current running in the LED?
No
Yes
Lead connection to the LED or R1 is in trouble, or the connector is poor in contact.
Is normal the voltage at the pin ⑪? (EP = 0.95V, LP = 0.8V)
Yes
No
Is a proper voltage applied to the photo transistor?
Is normal the voltage of zener diode X1? (7.5V)
No
RV1, R2 or photo transistor is in trouble.
Yes
Adjust RV2.
Yes
Adjust the sensitivity of photo transistor.
No
X1 and R4 are in trouble.
Yes
When the arm is moved inside the periphery of a disc, does the voltage at the pin (⑪) becomes higher?
No
C1, R6, R7 and C2 are in trouble.
Yes
Does there appear high-level pulse at the terminal ⑥ of IC1?
No
Is normal each voltage at the terminals ④ and ⑦ of IC1? ④ = 0V, ⑦ = 15V
Yes
No
When the arm is moved inside the periphery of a disc, is high-level pulse applied to the base of TR1?
IC1 terminal is poor in contact.
Yes
No
IC1 is in trouble.
X2, R8, C4, R13 and TR1 are in trouble.
Yes
At the same time, is low-level pulse applied to the collector of TR2?
No
TR1 and R10 are in trouble.
Yes
*

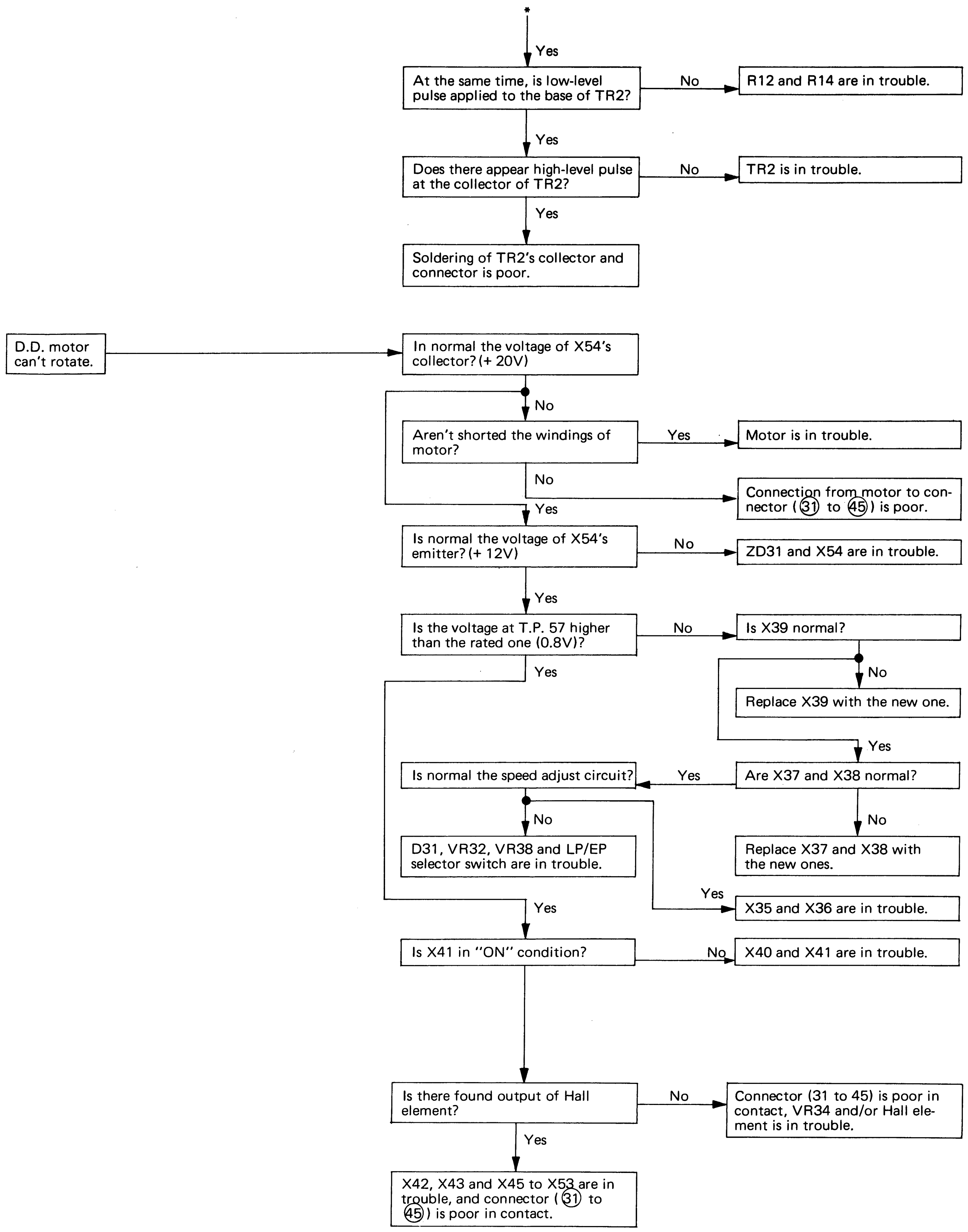
TROUBLE SHOOTING GUIDE


*2
*1
Is the emitter voltage of Q303 negative (1.3V)?
Yes
Check for Q303, Q304 and their peripheral circuits.
No
PH301 (positor) is damaged.
No sound comes out but noise is audible.
Does there occur hum when touching K222 and K223 (tone control unit)?
No
Leads connection is broken or poor in contact K222, K223, K237 and K238 (volume control unit).
Yes
Leads connection is broken or poor in contact K215, K216, K235 and K236 (volume control unit).
No
Does there occur hum when touching K215 and K216 (function unit)?
Yes
Set the function selector switch at any of the positions.
No
Is the function selector switch set at any of the positions?
R297 (100 ohm) of the function selector circuit is damaged, or Q207 and Q208 are defective.
Yes
No
Are the voltages of Q207 and Q208 (function selector circuit) normal?
No
Is the collector voltage of Q207 and Q208 at +32V?
Yes
Yes
Yes
Leads connection is broken or poor in contact in the function selector circuit.
Is the voltage at the function selector circuit normal? (Check for the terminal voltages of the socket (CNP202)).
No
Check for the touch control section.
No sound comes out at a particular function designated by the function selector switch.
The "PHONO" can't function.
Are the terminal voltages of IC201 and IC202 normal?
No
Is R217 (270 ohm) damaged?
No
Yes
Yes
Replace R217.
Is the base voltage of either Q207 or Q208 at +13.5V?
Yes
After the replacement, is the new R217 again damaged?
No
Yes
Yes
Is the voltage at the Pin ④ of socket (CNP202) at 33V?
Check for IC201, IC202 and their peripheral circuits.
No
Check for the touch control circuit.
Does there occur hum at the pin ⑥ of IC201 and IC202 when touching the pins ① and ③ of socket (CNP201).
R219 (10K ohm), R229 (100K ohm), R230 (100K ohm), and D201 and D202 (1S1555) are defective.
Yes
*3
C213, C214, C223, C224 (1MFD, 50V), and D201 and D202 (1S1555) are defective.
No
Check for the player circuit.

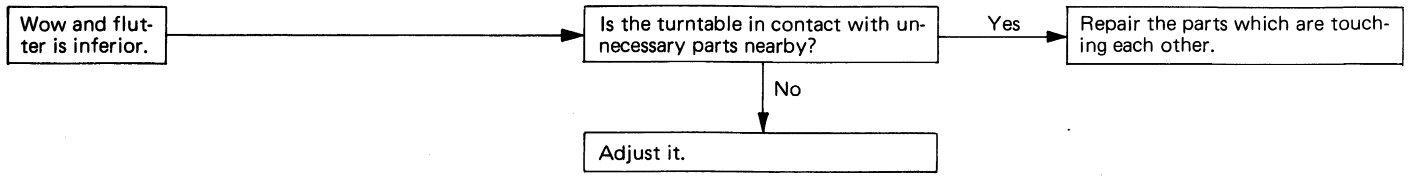
TROUBLE SHOOTING GUIDE

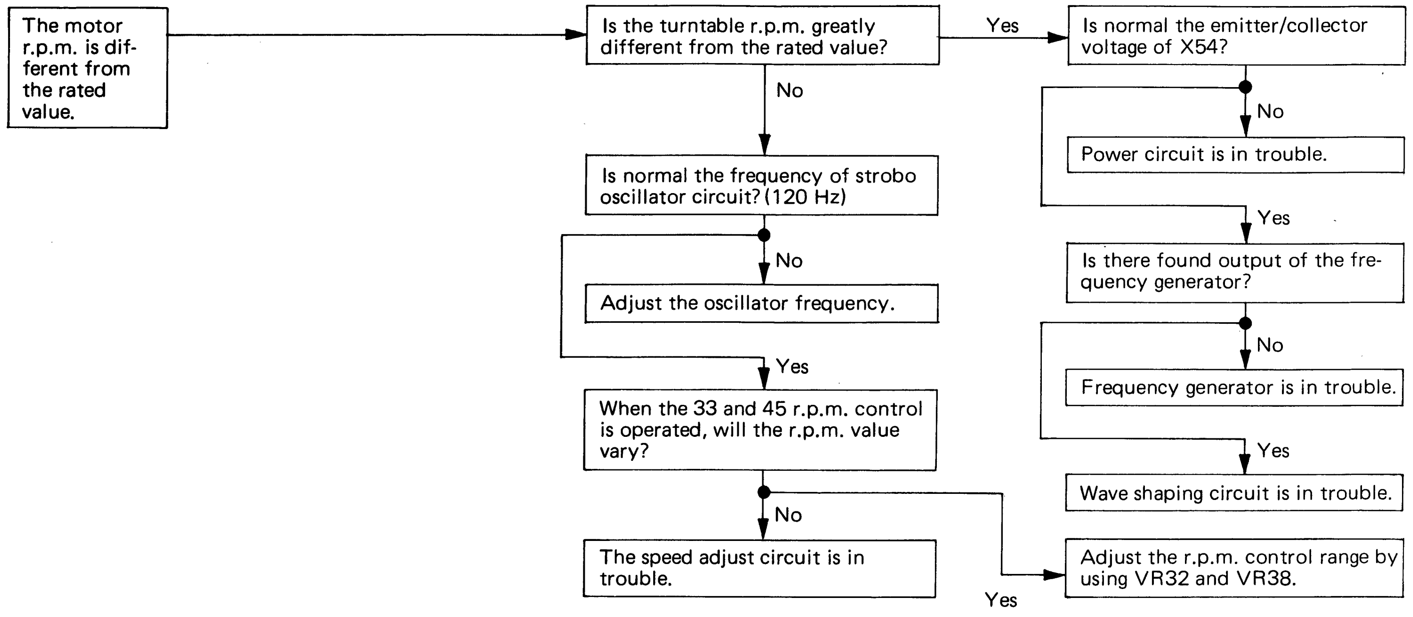

*3
The "MIC" can't function.
Are the terminal voltages of IC203 and IC204 normal?
No
Is R228 (100 ohm) damaged?
No
Yes
Yes
Replace R228.
Is the base voltage of either Q207 or Q208 at +13.5V?
Yes
After the replacement, is the new R228 again damaged?
No
Yes
Yes
Is the voltage at the pin ③ of socket (CNP202) at 33V?
Check for IC203, IC204 and their peripheral circuits.
No
Check for the touch control circuit.
Does there occur hum at K211 and K212 when touching R207 and K208.
No
Check for R223 (10K ohm), R233, R234 (100K ohm), D205, D206 (1S1555), C227 and C228 (1MFD, 50V).
Yes
C227, C228 (1MFD, 50V), and D206 and D206 (1S1555) are defective.
The mic. jack is poor in contact, and leads connection is broken or poor in contact between the function PWB and mic jack PWB.
The "AUX" can't function.
Is there conduction between the DIN terminals (S0103) ③ and ⑤, and K251 and K252?
No
Leads connection is broken or poor in contact among K143, K144, K251 and K252.
Yes
Is there conduction between K251 and K252, and K253 and K254?
No
The mic jack is poor in contact.
Yes
Is there conduction between K253 and K254, and K211 and K212?
No
Leads connection is broken or poor in contact among K253, K254, K211 and K212.
The "TAPE" can't function.
Is the base voltage of either Q207 or Q208 at 13.5V?
Yes
Does there occur hum when touching K201 and K202?
Yes
No
No
Is the voltage at the pin ⑤ of plug (CNP202) at 33V?
Yes
C225, C226 (1MFD, 50V), D203 D204 (1S1555) are defective.
No
*4
Check for the touch control circuit.
The socket (CNS504) is poor in contact, or check for the tape output circuit.
Check for R221 (10K ohm), R231, R232 (100K ohm), D203 and D204 (1S1555).

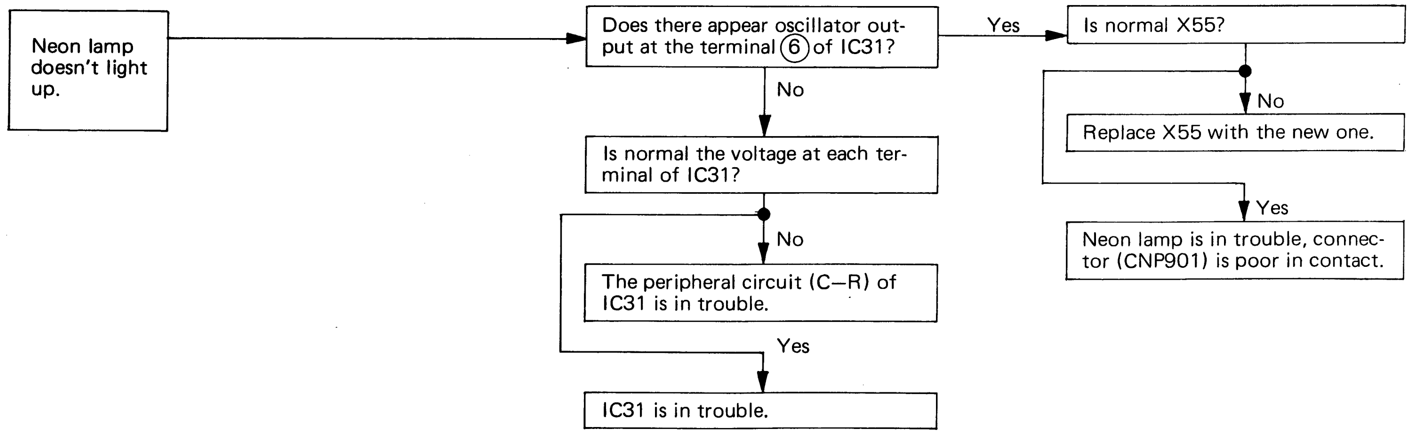
TROUBLE SHOOTING GUIDE


*
Yes
At the same time, is low-level pulse applied to the base of TR2?
No
R12 and R14 are in trouble.
Yes
Does there appear high-level pulse at the collector of TR2?
No
TR2 is in trouble.
Yes
Soldering of TR2's collector and connector is poor.
D.D. motor can't rotate.
In normal the voltage of X54's collector? (+ 20V)
No
Aren't shorted the windings of motor?
Yes
Motor is in trouble.
No
Connection from motor to connector (㉛ to ㊺) is poor.
Yes
Is normal the voltage of X54's emitter? (+ 12V)
No
ZD31 and X54 are in trouble.
Yes
Is the voltage at T.P. 57 higher than the rated one (0.8V)?
No
Is X39 normal?
No
Replace X39 with the new one.
Yes
Yes
Are X37 and X38 normal?
Yes
Is normal the speed adjust circuit?
No
Replace X37 and X38 with the new ones.
No
D31, VR32, VR38 and LP/EP selector switch are in trouble.
Yes
X35 and X36 are in trouble.
Yes
Is X41 in "ON" condition?
No
X40 and X41 are in trouble.
Is there found output of Hall element?
No
Connector (31 to 45) is poor in contact, VR34 and/or Hall element is in trouble.
Yes
X42, X43 and X45 to X53 are in trouble, and connector (㉛ to ㊺) is poor in contact.

TROUBLE SHOOTING GUIDE


Wow and flutter is inferior.
Is the turntable in contact with unnecessary parts nearby?
Yes
Repair the parts which are touching each other.
No
Adjust it.


The motor r.p.m. is different from the rated value.
Is the turntable r.p.m. greatly different from the rated value?
Yes
Is normal the emitter/collector voltage of X54?
No
Power circuit is in trouble.
Yes
Is there found output of the frequency generator?
No
Frequency generator is in trouble.
Yes
Wave shaping circuit is in trouble.
No
Is normal the frequency of strobo oscillator circuit? (120 Hz)
No
Adjust the oscillator frequency.
Yes
When the 33 and 45 r.p.m. control is operated, will the r.p.m. value vary?
No
The speed adjust circuit is in trouble.
Yes
Adjust the r.p.m. control range by using VR32 and VR38.


Neon lamp doesn't light up.
Does there appear oscillator output at the terminal ⑥ of IC31?
Yes
Is normal X55?
No
Replace X55 with the new one.
Yes
Neon lamp is in trouble, connector (CNP901) is poor in contact.
No
Is normal the voltage at each terminal of IC31?
No
The peripheral circuit (C–R) of IC31 is in trouble.
Yes
IC31 is in trouble.

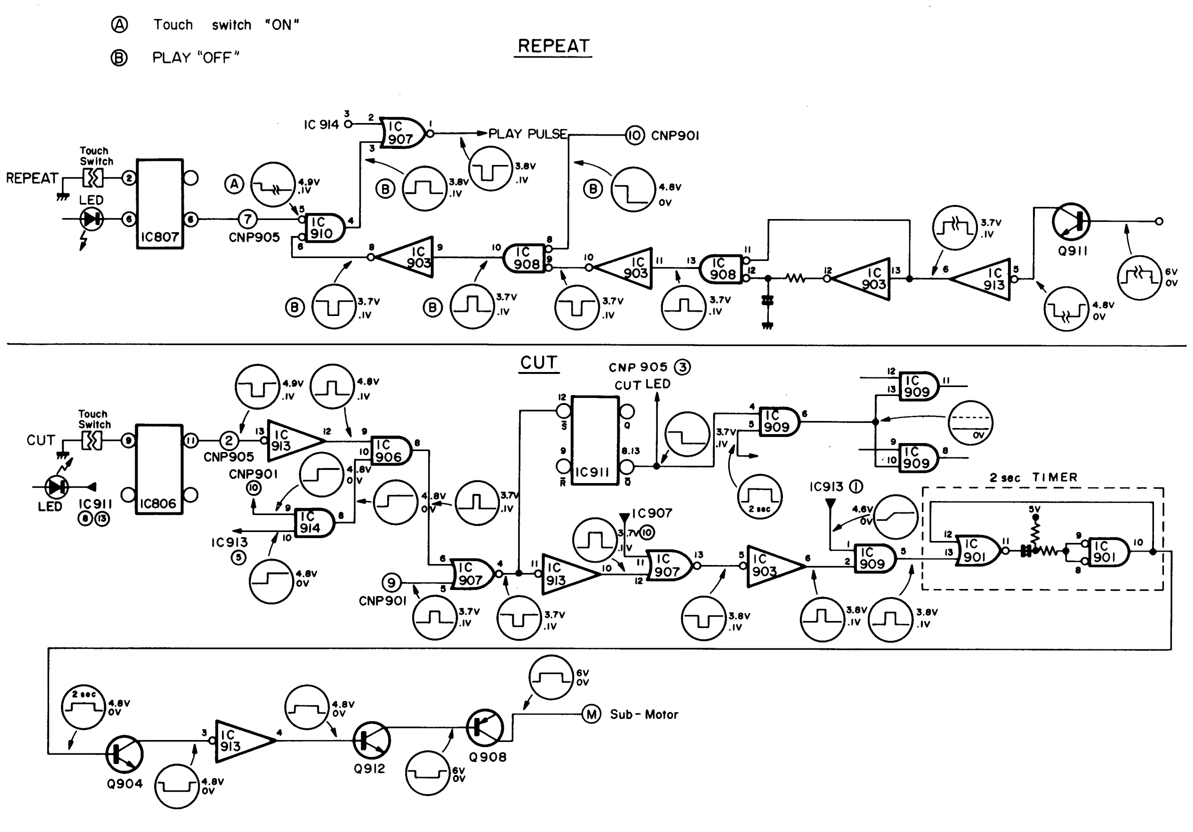

Ⓐ Touch switch "ON"
Ⓑ PLAY "OFF"
REPEAT
REPEAT
Touch Switch
LED
IC807
CNP905
IC 914
IC 907
PLAY PULSE
CNP901
IC 910
IC 903
IC 908
IC 913
Q911
CUT
CUT
Touch Switch
LED
IC911
IC806
CNP905
CNP901
IC 913
IC 906
IC 914
CNP 905 ③
CUT LED
IC911
IC 909
IC907
IC 903
IC913 ⑩
2 sec TIMER
IC 901
Q904
Q912
Q908
Sub - Motor

Figure 121–1 SIGNAL FLOW CHART (PLAYER LOGIC: REPEAT)

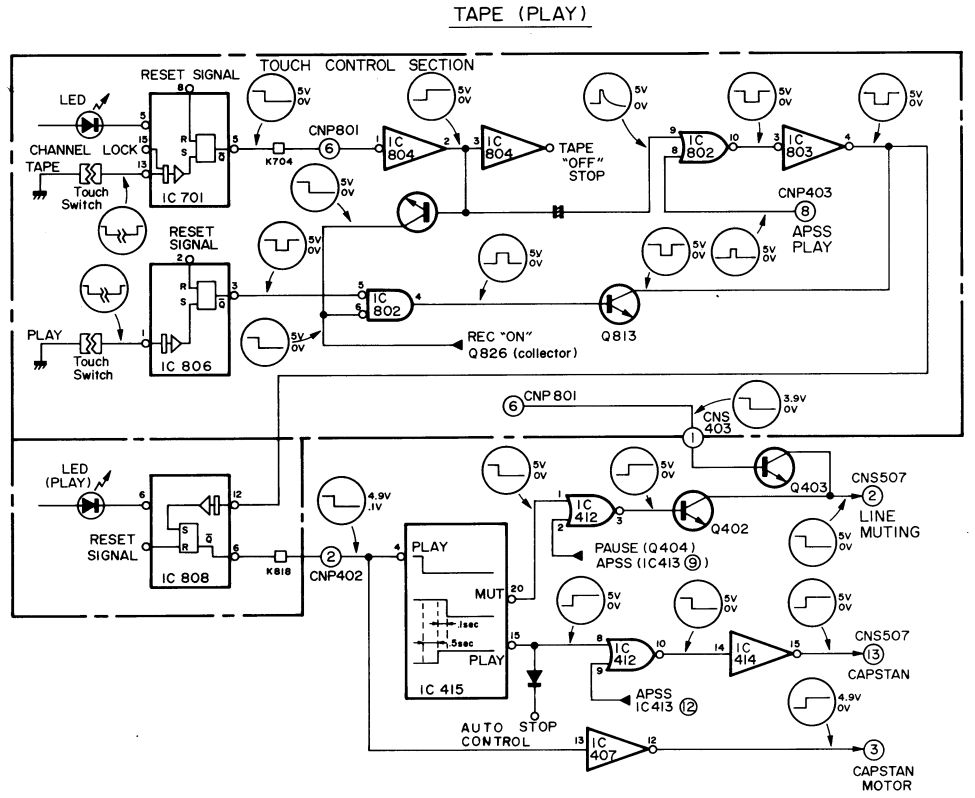

TAPE (PLAY)
TOUCH CONTROL SECTION
RESET SIGNAL
LED
CHANNEL LOCK
TAPE
Touch Switch
IC 701
K704
CNP801
IC 804
TAPE "OFF" STOP
IC 802
IC 803
CNP403
APSS PLAY
RESET SIGNAL
PLAY
Touch Switch
IC 806
IC 802
REC "ON" Q826 (collector)
Q813
CNP 801
CNS 403
LED (PLAY)
RESET SIGNAL
IC 808
K818
CNP402
PLAY
MUT
IC 415
IC 412
PAUSE (Q404)
APSS (IC413 ⑨)
Q402
Q403
CNS507
LINE MUTING
APSS IC413 ⑫
IC 414
CAPSTAN
AUTO STOP CONTROL
IC 407
CAPSTAN MOTOR

Figure 122–1 SIGNAL FLOW CHART (TAPE LOGIC: TAPE/PLAY)

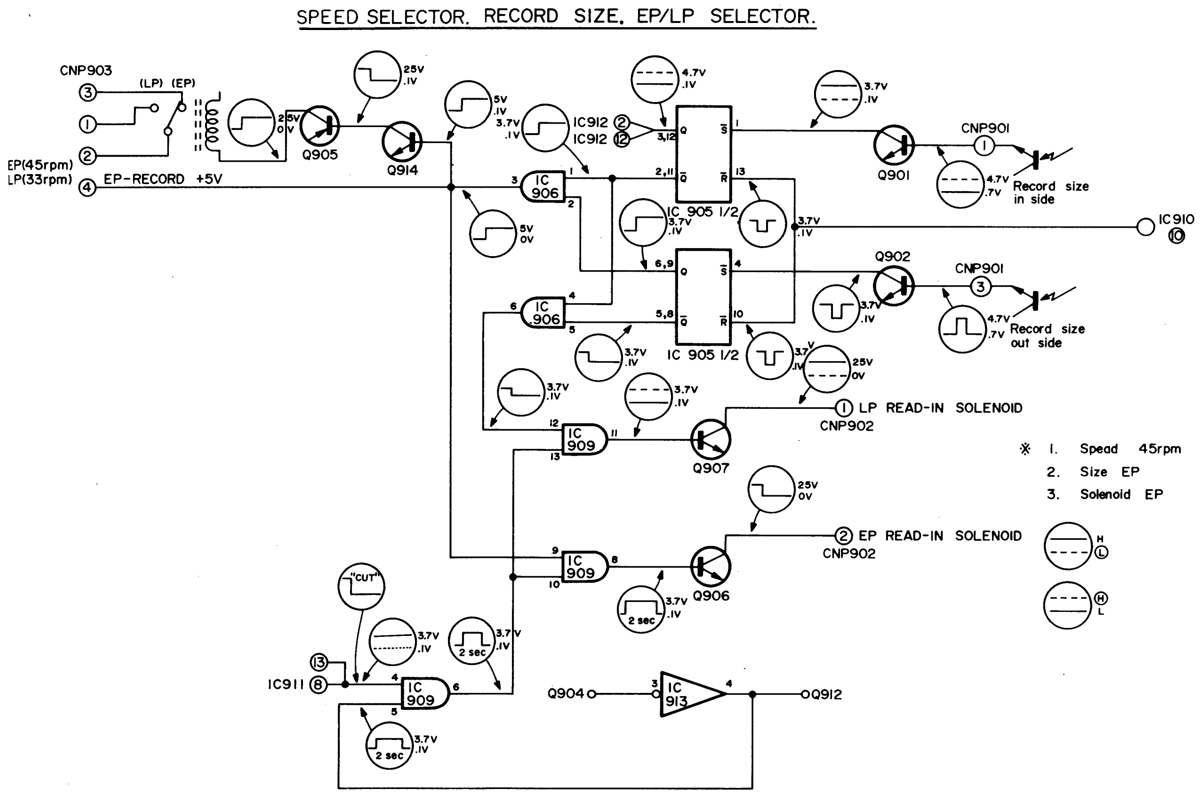

SPEED SELECTOR. RECORD SIZE. EP/LP SELECTOR.
CNP903
(LP) (EP)
EP(45rpm)
LP(33rpm)
EP-RECORD +5V
Q905
Q914
IC912 ②
IC912 ⑫
IC 906
IC 905 1/2
IC 905 1/2
IC 906
Q901
CNP901
Record size in side
IC910 ⑩
Q902
CNP901
Record size out side
IC 909
Q907
LP READ-IN SOLENOID
CNP902
※ 1. Speed 45rpm
2. Size EP
3. Solenoid EP
IC 909
Q906
EP READ-IN SOLENOID
CNP902
"CUT"
IC911
IC 909
Q904
IC 913
Q912

Figure 121–2 SIGNAL FLOW CHART (PLAYER LOGIC: SPEED/RECORD SIZE/EP-LP SELECTOR SOLENOID)

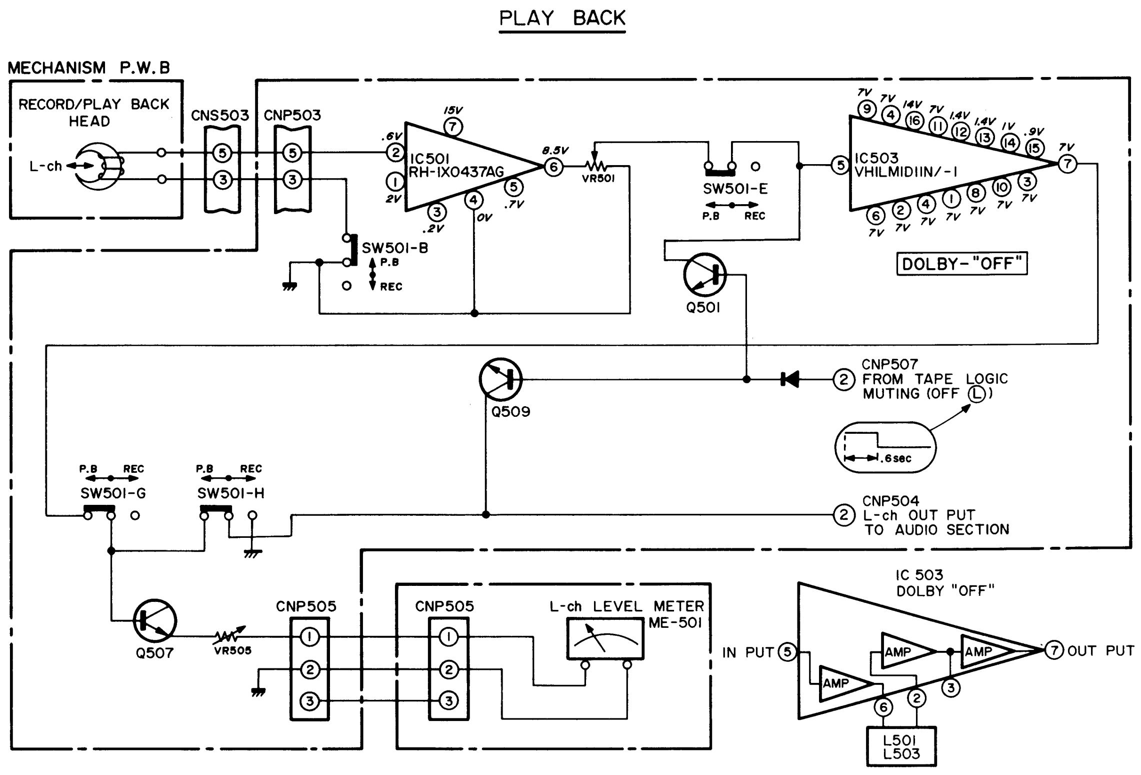

PLAY BACK
MECHANISM P.W.B
RECORD/PLAY BACK HEAD
L-ch
CNS503
CNP503
IC501 RH-IX0437AG
VR501
SW501-E
P.B REC
IC503 VHILMIDIIN/-I
DOLBY-"OFF"
SW501-B
P.B
REC
Q501
Q509
CNP507 FROM TAPE LOGIC MUTING (OFF Ⓛ)
.6sec
CNP504 L-ch OUT PUT TO AUDIO SECTION
SW501-G
SW501-H
Q507
VR505
CNP505
CNP505
L-ch LEVEL METER ME-501
IC 503 DOLBY "OFF"
IN PUT
AMP
AMP
AMP
OUT PUT
L501 L503

Figure 122–2 SIGNAL FLOW CHART (TAPE LOGIC: PLAY BACK)

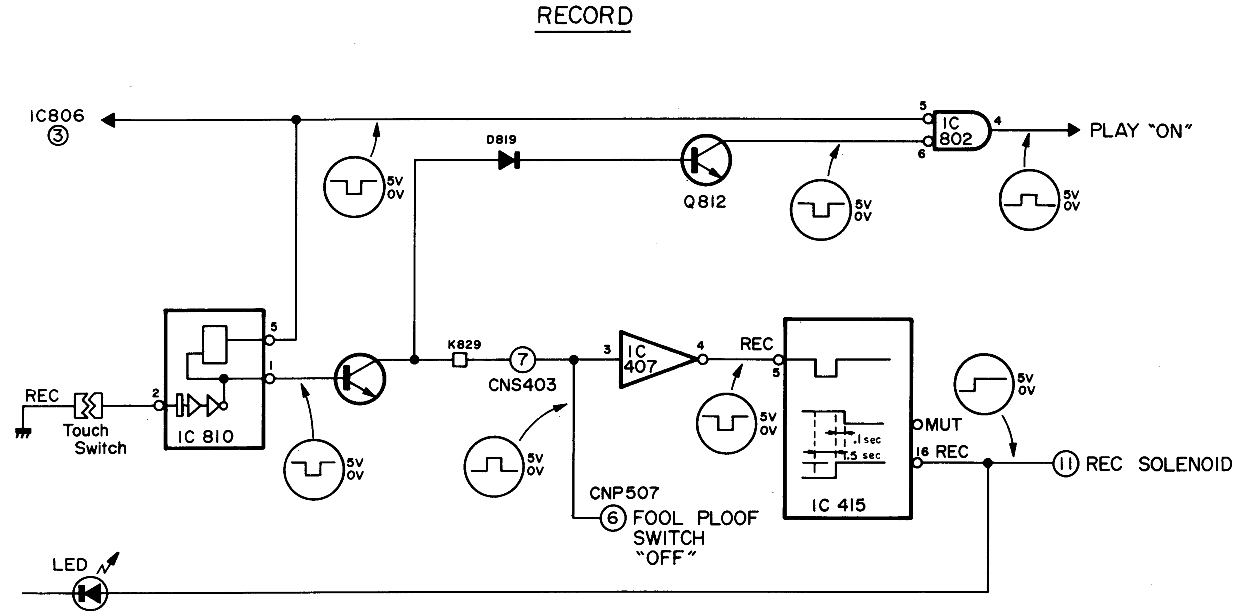

RECORD
IC806 ③
IC 802
PLAY "ON"
D819
Q812
REC
Touch Switch
IC 810
K829
CNS403
IC 407
REC
CNP507
⑥ FOOL PLOOF SWITCH "OFF"
.1 sec
1.5 sec
MUT
REC
IC 415
⑪ REC SOLENOID
LED
5V
0V

Figure 123—1 SIGNAL FLOW CHART (TAPE LOGIC: RECORD)

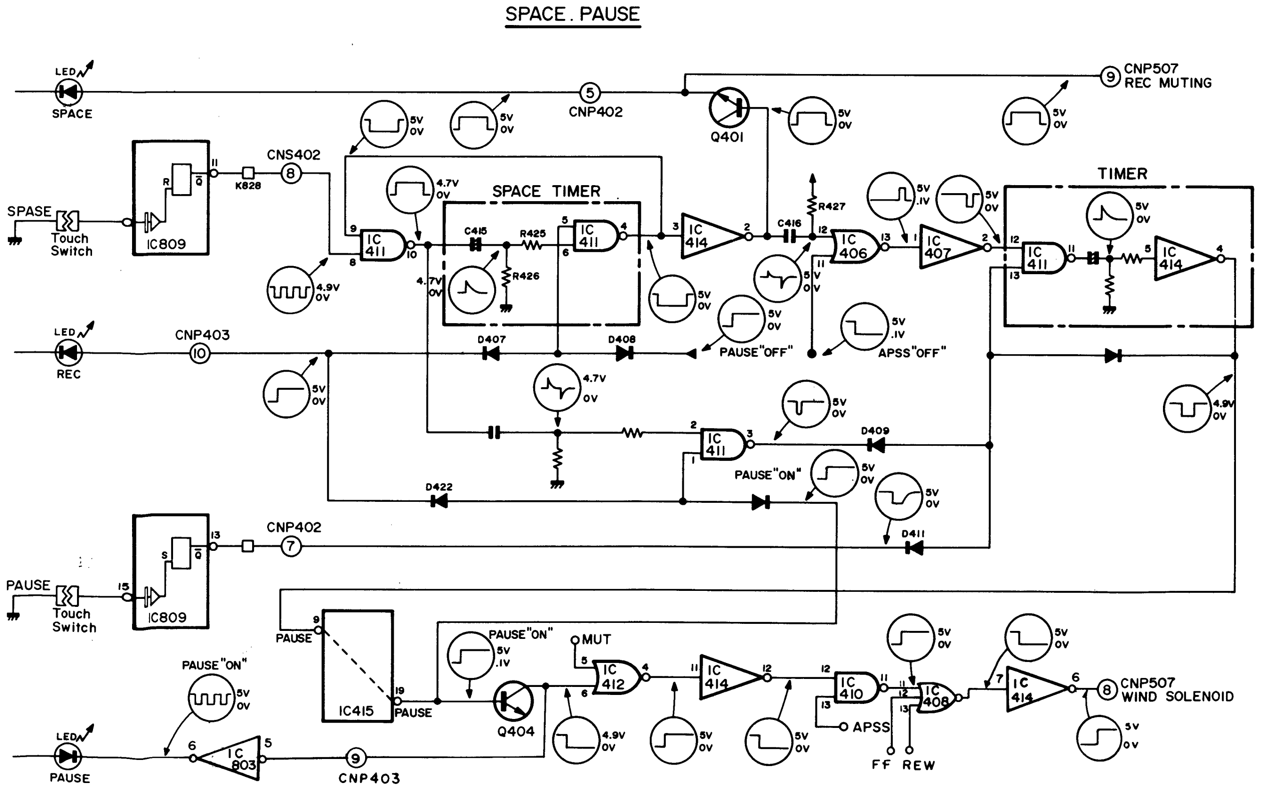

SPACE. PAUSE
LED
SPACE
CNP402
CNP507 REC MUTING
Q401
SPASE
Touch Switch
IC809
CNS402
K828
SPACE TIMER
IC 411
IC 414
IC 406
IC 407
TIMER
C415
R425
R426
C416
R427
LED
REC
CNP403
D407
D408
PAUSE "OFF"
APSS "OFF"
IC 411
D409
PAUSE "ON"
D422
D411
PAUSE
Touch Switch
IC809
CNP402
PAUSE "ON"
IC415
PAUSE
MUT
Q404
IC 412
IC 414
IC 410
IC 408
APSS
FF REW
IC 414
CNP507 WIND SOLENOID
LED
PAUSE
IC 803
CNP403
5V
0V
4.9V
4.7V
.1V

Figure 123—2 SIGNAL FLOW CHART (TAPE LOGIC: SPACE/PAUSE)

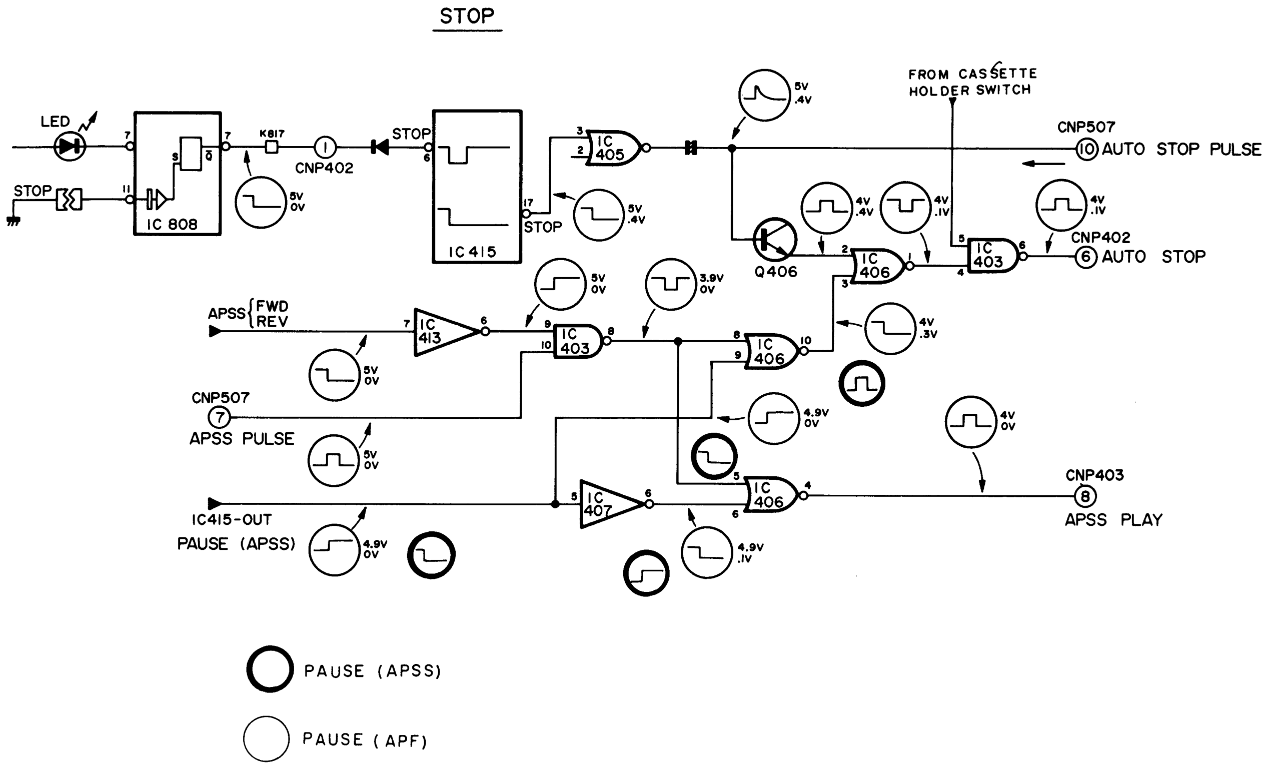

STOP
LED
STOP
IC 808
K817
CNP402
STOP
IC 415
STOP
IC 405
FROM CASSETTE HOLDER SWITCH
CNP507
⑩ AUTO STOP PULSE
Q406
IC 406
IC 403
CNP402
⑥ AUTO STOP
APSS {FWD REV
IC 413
IC 403
IC 406
CNP507
⑦
APSS PULSE
IC415-OUT
PAUSE (APSS)
IC 407
IC 406
CNP403
⑧
APSS PLAY
PAUSE (APSS)
PAUSE (APF)
5V
0V
4V
.4V
.1V
3.9V
4.9V
.3V

Figure 124—1 SIGNAL FLOW CHART (TAPE LOGIC: STOP)

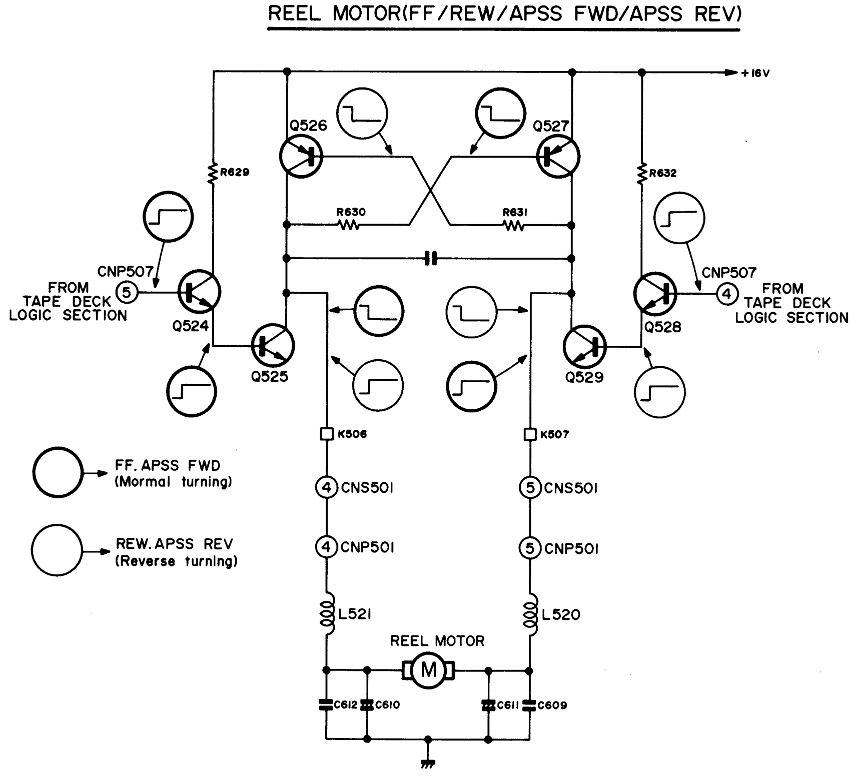

REEL MOTOR(FF/REW/APSS FWD/APSS REV)
+16V
Q526
Q527
R629
R632
R630
R631
CNP507
FROM TAPE DECK LOGIC SECTION
Q524
Q525
Q528
Q529
CNP507
FROM TAPE DECK LOGIC SECTION
K506
K507
FF. APSS FWD (Mormal turning)
REW. APSS REV (Reverse turning)
CNS501
CNP501
L521
L520
REEL MOTOR
M
C612
C610
C611
C609

Figure 124—2 SIGNAL FLOW CHART (TAPE LOGIC: REEL MOTOR)

FF. REW

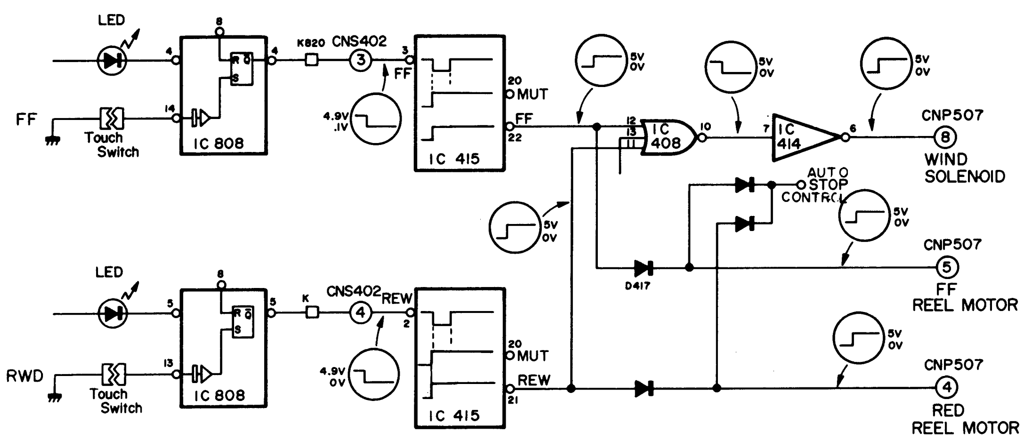
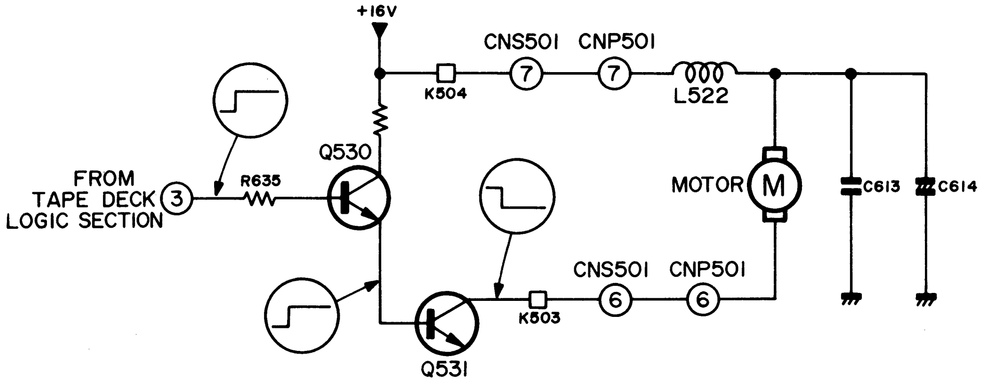

LED
FF
Touch Switch
IC 808
K820 CNS402
③
FF
4.9V .1V
20 MUT
FF
22
IC 415
5V 0V
12 13 IC 408
10
7 IC 414
6
CNP507
⑧
WIND SOLENOID
AUTO STOP CONTROL
D417
CNP507
⑤
FF REEL MOTOR
LED
RWD
Touch Switch
IC 808
CNS402 REW
④
4.9V 0V
20 MUT
REW
21
IC 415
CNP507
④
RED REEL MOTOR

Figure 125–1 SIGNAL FLOW CHART (TAPE LOGIC: FAST FORWARD)

CAPSTAN MOTOR


+16V
CNS501 CNP501
K504
⑦ ⑦
L522
Q530
FROM TAPE DECK LOGIC SECTION ③
R635
MOTOR
M
C613
C614
CNS501 CNP501
K503
⑥ ⑥
Q531

PLAY, PLAY/PAUSE, REC/PLAY, REC/PAUSE, REC/SPACE — MOTOR "ON"

Figure 125–2 SIGNAL FLOW CHART (TAPE LOGIC: CAPSTAN MOTOR)

RESET SIGNAL

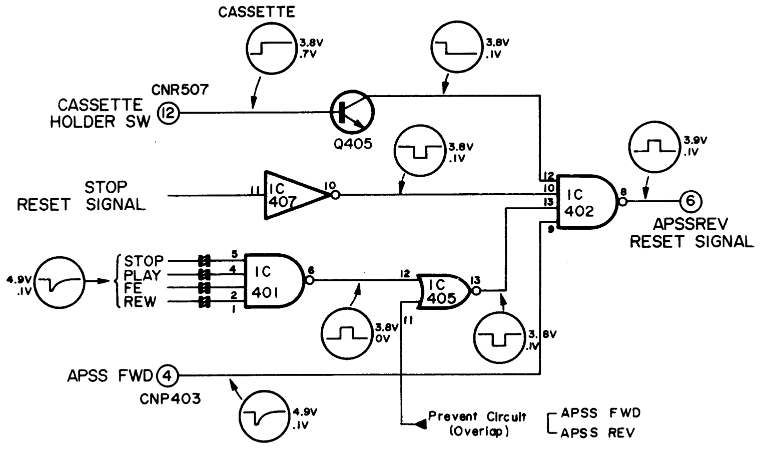
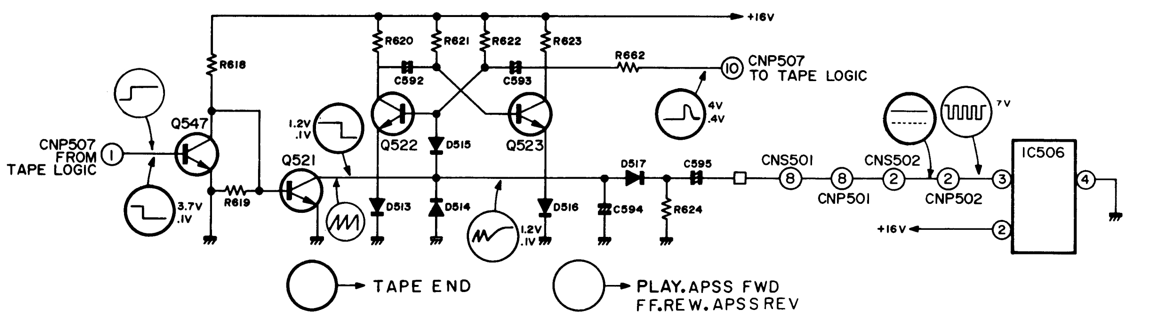

CASSETTE
3.8V .7V
CNR507
CASSETTE HOLDER SW ⑫
3.8V .1V
Q405
3.8V .1V
3.9V .1V
STOP RESET SIGNAL
IC 407
IC 402
⑥
APSSREV RESET SIGNAL
4.9V .1V
STOP
PLAY
FF
REW
IC 401
IC 405
3.8V 0V
3.8V .1V
APSS FWD ④
CNP403
4.9V .1V
Prevent Circuit (Overlap)
APSS FWD
APSS REV

Figure 125–3 SIGNAL FLOW CHART (TAPE LOGIC: RESET)

FULL AUTO STOP


+16V
R618
R620 R621 R622 R623
C592 C593
R662
⑩ CNP507 TO TAPE LOGIC
CNP507 FROM TAPE LOGIC ①
Q547
1.2V .1V
Q521
Q522
D515
Q523
4V .4V
3.7V .1V
R619
D513
D514
D516
1.2V .1V
D517
C595
C594
R624
CNS501
⑧
CNP501
CNS502
②
②
CNP502
③
IC506
④
+16V
②
7V
TAPE END
PLAY, APSS FWD
FF, REW, APSS REV

REC SOLENOID

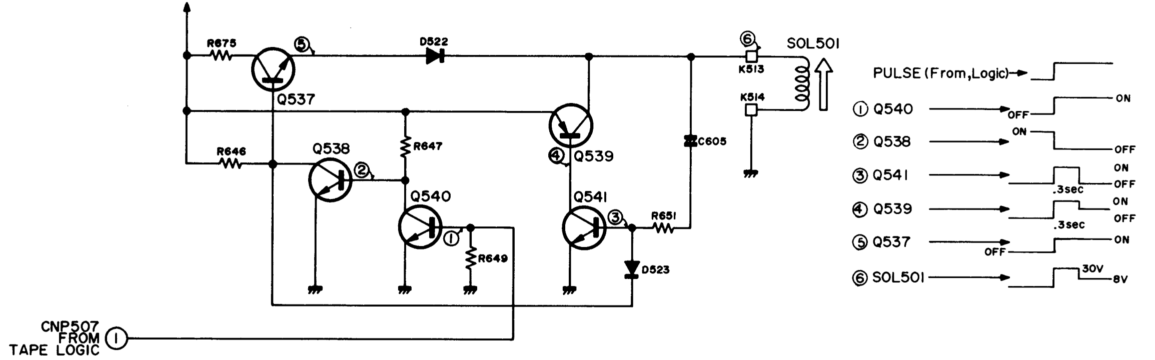

+36V
R675
⑤
D522
⑥
SOL501
K513
K514
Q537
R646
Q538
②
R647
Q540
①
R649
④ Q539
Q541
③
R651
D523
C605
CNP507 FROM TAPE LOGIC ①
PULSE (From Logic)
① Q540
OFF
ON
② Q538
ON
OFF
③ Q541
ON
.3sec
OFF
④ Q539
ON
.3sec
OFF
⑤ Q537
OFF
ON
⑥ SOL501
30V
8V

Figure 126–1 SIGNAL FLOW CHART (TAPE LOGIC: FULL AUTO STOP)

APSS

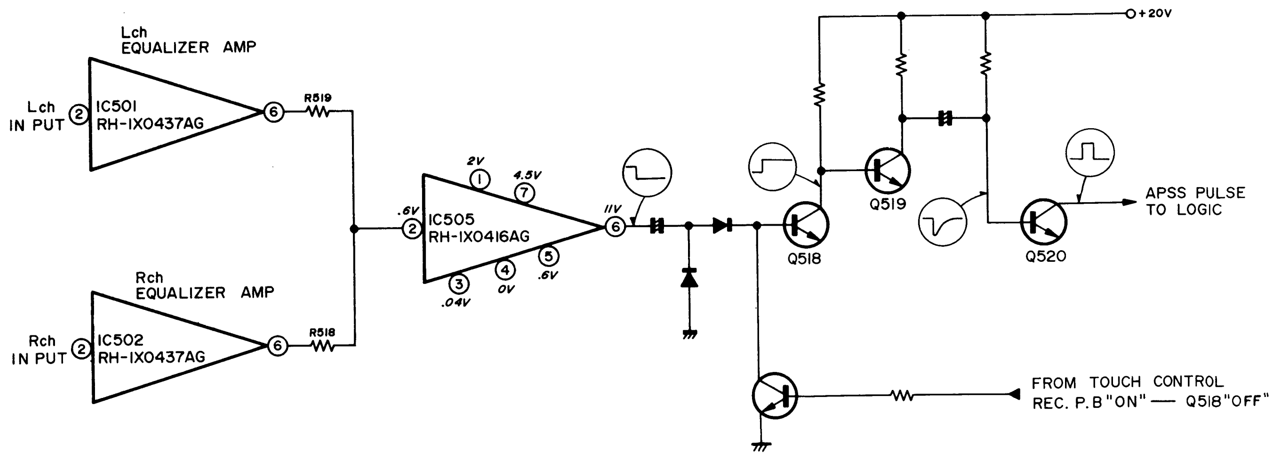

+20V
Lch EQUALIZER AMP
Lch IN PUT ②
IC501 RH-IX0437AG
⑥
R519
2V
4.5V
①
⑦
.6V ②
IC505 RH-IX0416AG
11V ⑥
⑤
③
④
.04V
0V
.6V
Rch EQUALIZER AMP
Rch IN PUT ②
IC502 RH-IX0437AG
⑥
R518
Q518
Q519
Q520
APSS PULSE TO LOGIC
FROM TOUCH CONTROL
REC. P.B "ON" — Q518 "OFF"

Figure 126–2 SIGNAL FLOW CHART (TAPE LOGIC: APSS)

RECORD

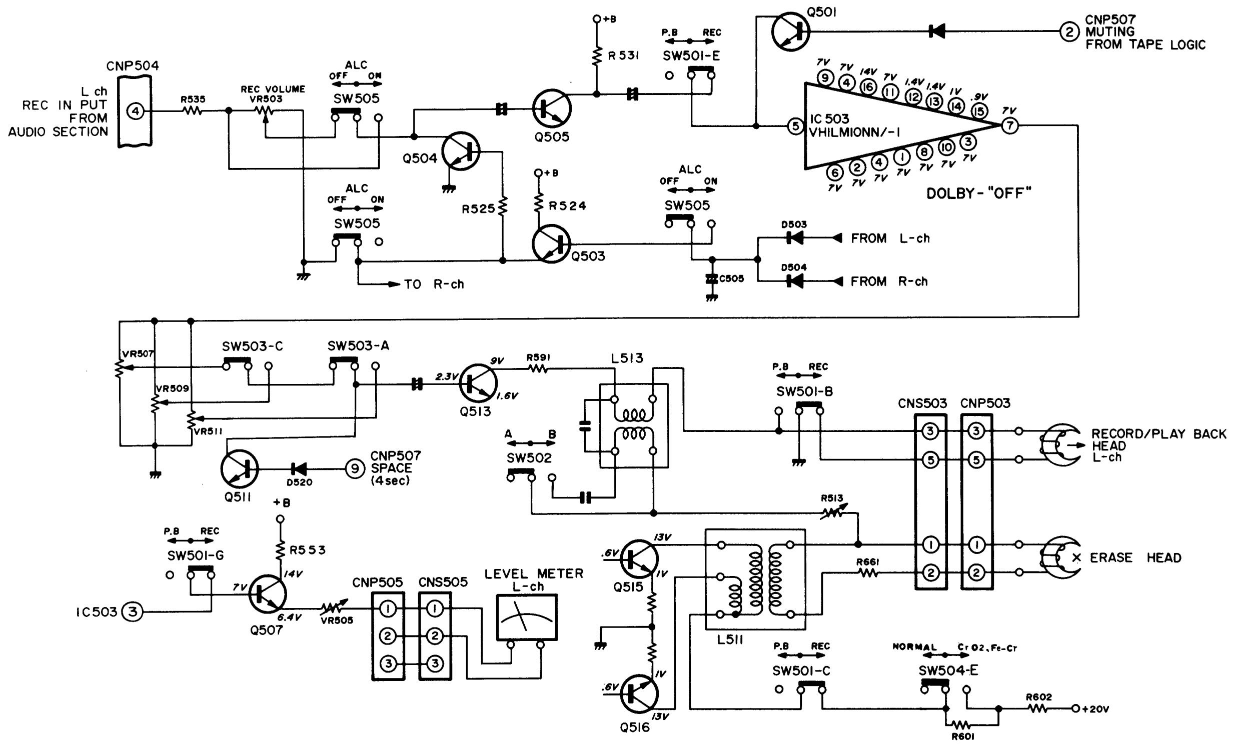

CNP504
L ch
REC IN PUT
FROM
AUDIO SECTION
R535
REC VOLUME
VR503
ALC
OFF ON
SW505
Q504
Q505
R531
P.B REC
SW501-E
Q501
CNP507
MUTING
FROM TAPE LOGIC
IC 503
VHILMIONN/-I
DOLBY-"OFF"
R525
R524
SW505
Q503
D503
FROM L-ch
D504
FROM R-ch
C505
TO R-ch
VR507
VR509
VR511
SW503-C
SW503-A
Q513
R591
L513
SW502
SW501-B
CNS503
CNP503
RECORD/PLAY BACK
HEAD
L-ch
Q511
D520
CNP507
SPACE
(4sec)
R553
SW501-G
IC503
Q507
VR505
CNP505
CNS505
LEVEL METER
L-ch
Q515
R513
R661
ERASE HEAD
L511
Q516
SW501-C
NORMAL Cr O2, Fe-Cr
SW504-E
R602
R601
+20V

Figure 127–1 SIGNAL FLOW CHART (TAPE LOGIC: RECORD AMP.)

DOLBY "ON"

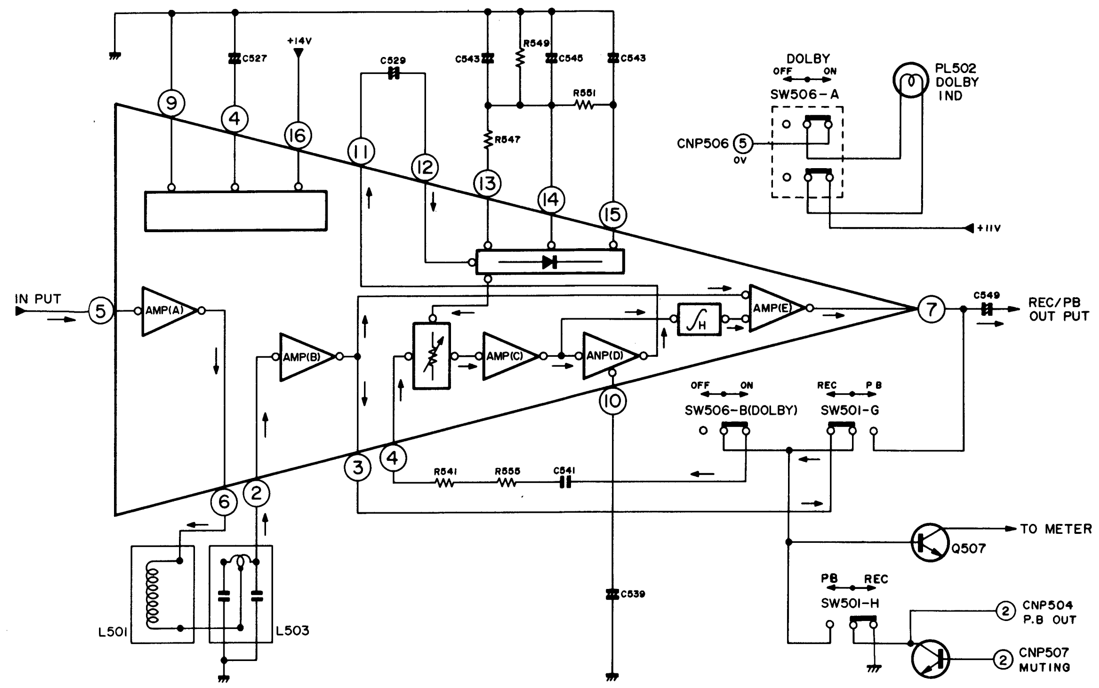

C527
+14V
C529
C543
R549
C545
C543
R551
R547
DOLBY
OFF ON
SW506-A
PL502
DOLBY
IND
CNP506
0V
+11V
IN PUT
AMP(A)
AMP(B)
AMP(C)
AMP(D)
AMP(E)
C549
REC/PB
OUT PUT
SW506-B(DOLBY)
SW501-G
R541
R555
C541
L501
L503
C539
Q507
TO METER
PB REC
SW501-H
CNP504
P.B OUT
CNP507
MUTING

Figure 127–2 SIGNAL FLOW CHART (TAPE LOGIC: DOLBY NR)

RESET SIGNAL

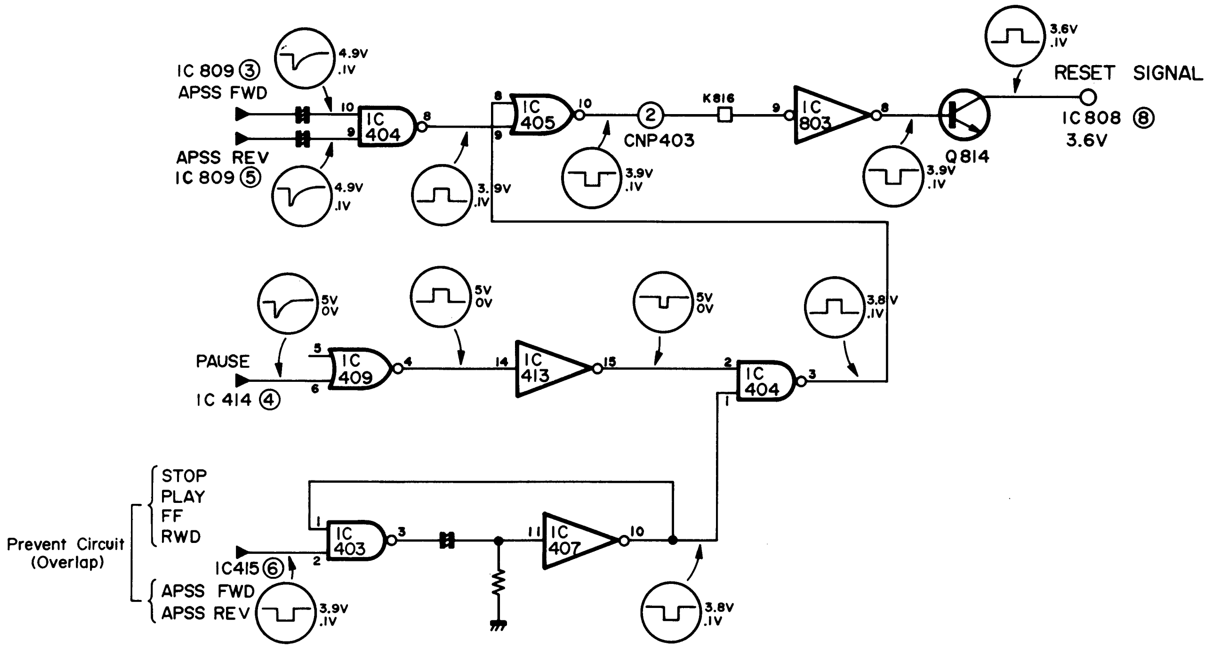

IC 809 ③
APSS FWD
4.9V
.1V
APSS REV
IC 809 ⑤
IC 404
IC 405
CNP403
K816
IC 803
Q814
3.6V
.1V
RESET SIGNAL
IC808 ⑧
3.6V
3.9V
.1V
PAUSE
IC 414 ④
IC 409
IC 413
IC 404
5V
0V
3.8V
STOP
PLAY
FF
RWD
Prevent Circuit
(Overlap)
IC415 ⑥
APSS FWD
APSS REV
IC 403
IC 407

Figure 128–1 SIGNAL FLOW CHART (TAPE LOGIC: RESET)

REC/PB SOLENIDand FF/RWD SOLENID

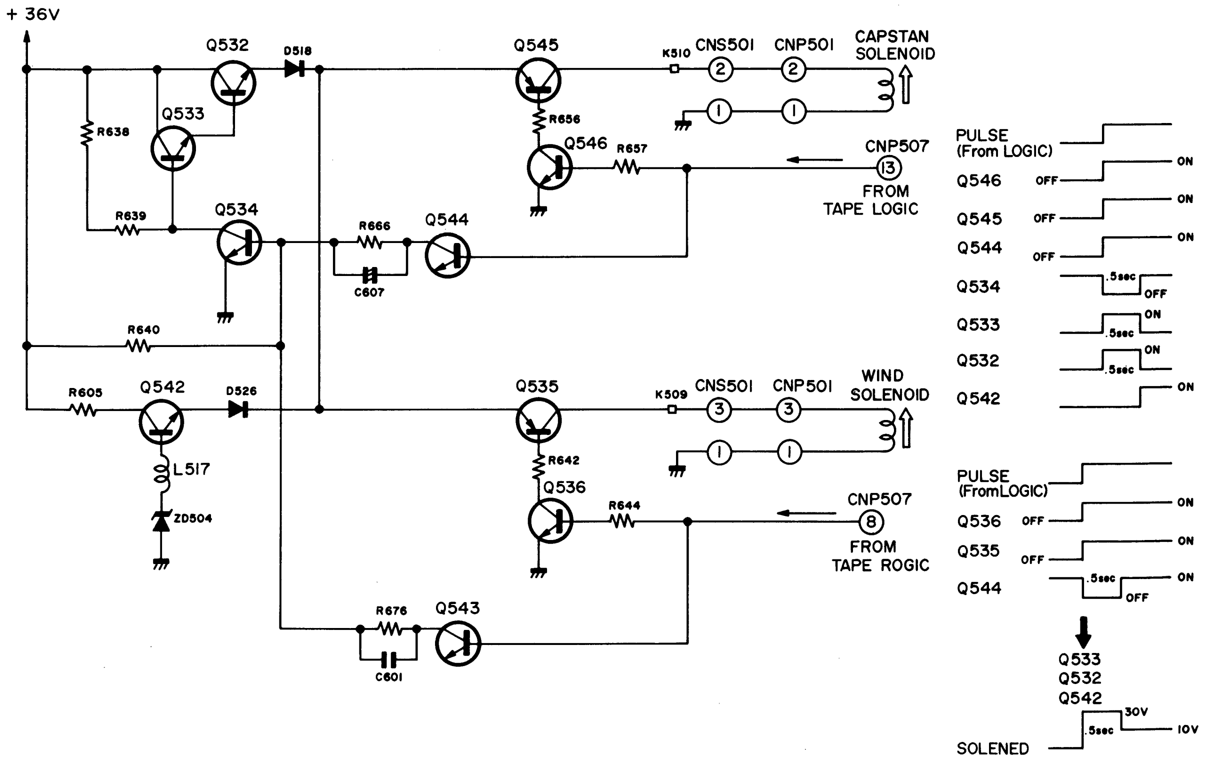

+36V
Q532
D518
Q545
K510
CNS501
CNP501
CAPSTAN
SOLENOID
R638
Q533
R656
Q546
R657
CNP507
FROM
TAPE LOGIC
R639
Q534
R666
Q544
C607
R640
R605
Q542
D526
Q535
K509
WIND
SOLENOID
L517
ZD504
R642
Q536
R644
FROM
TAPE ROGIC
R676
Q543
C601
PULSE
(From LOGIC)
Q546
Q545
Q544
Q534
Q533
Q532
Q542
OFF
ON
.5sec
Q536
Q535
SOLENED
30V
10V

Figure 128–2 SIGNAL FLOW CHART (TAPE LOGIC: REC/PB SOLENOID·FF/RWD SOLENOID)

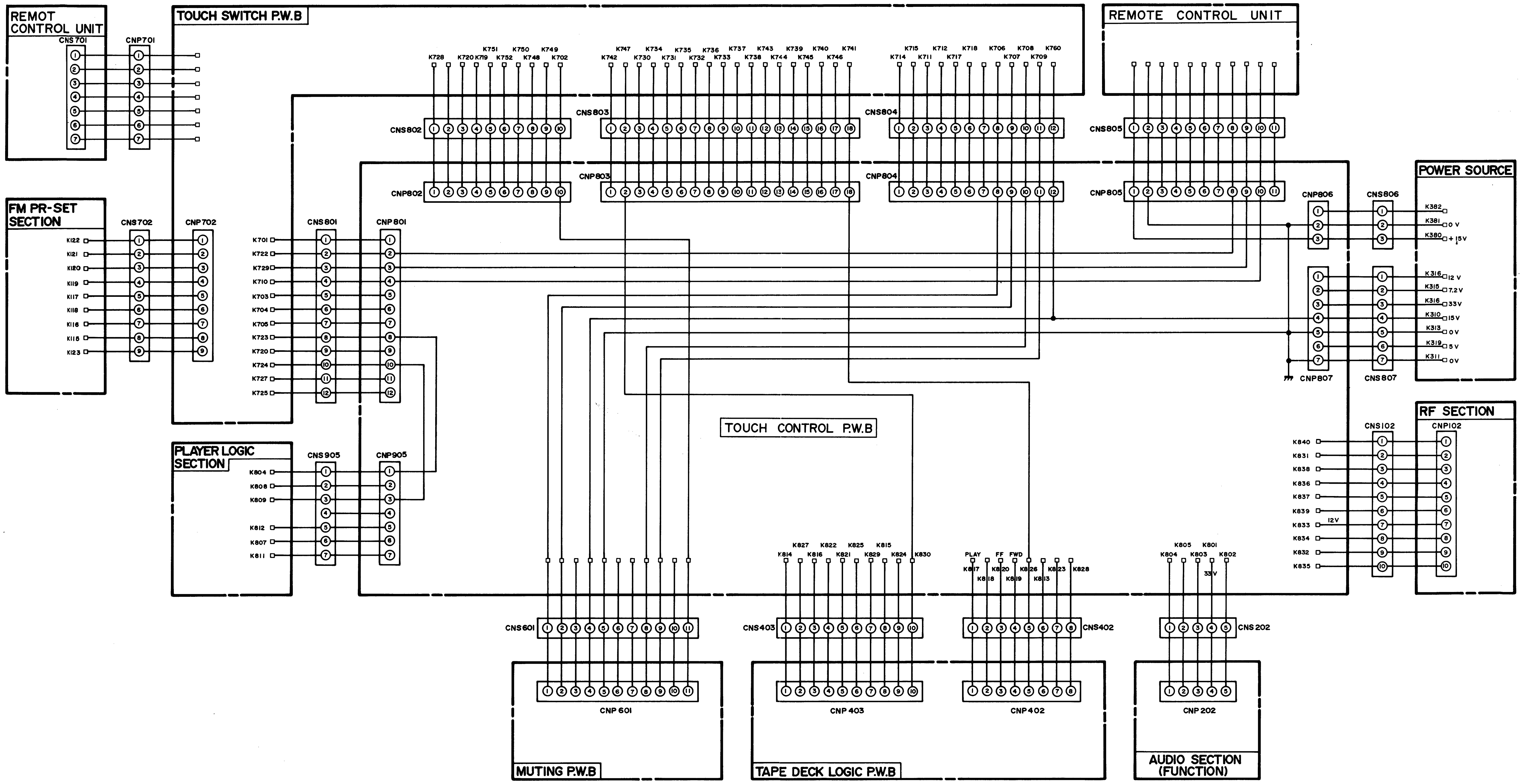

REMOT CONTROL UNIT
CNS701
CNP701
TOUCH SWITCH P.W.B
REMOTE CONTROL UNIT
K751 K750 K749
K728 K720 K719 K752 K748 K702
K747 K734 K735 K736 K737 K743 K739 K740 K741
K742 K730 K731 K732 K733 K738 K744 K745 K746
K715 K712 K718 K706 K708 K760
K714 K711 K717 K707 K709
CNS802
CNS803
CNS804
CNS805
CNP802
CNP803
CNP804
CNP805
FM PR-SET SECTION
CNS702
CNP702
K122
K121
K120
K119
K117
K118
K116
K115
K123
CNS801
CNP801
K701
K722
K729
K710
K703
K704
K705
K723
K720
K724
K727
K725
POWER SOURCE
CNP806
CNS806
K382
K381 0 V
K380 + 15V
K316 12 V
K315 7.2 V
K316 33V
K310 15V
K313 0V
K319 5 V
K311 0V
CNP807
CNS807
TOUCH CONTROL P.W.B
PLAYER LOGIC SECTION
CNS905
CNP905
K804
K808
K809
K812
K807
K811
RF SECTION
CNS102
CNP102
K840
K831
K838
K836
K837
K839
12V
K833
K834
K832
K835
K827 K822 K825 K815
K814 K816 K821 K829 K824 K830
PLAY FF FWD
K817 K820 K826 K823 K828
K818 K819 K813
K805 K801
K804 K803 K802
33V
CNS601
CNS403
CNS402
CNS202
CNP601
CNP403
CNP402
CNP202
MUTING P.W.B
TAPE DECK LOGIC P.W.B
AUDIO SECTION (FUNCTION)

Figure 129–1 CONNECTION GUIDE

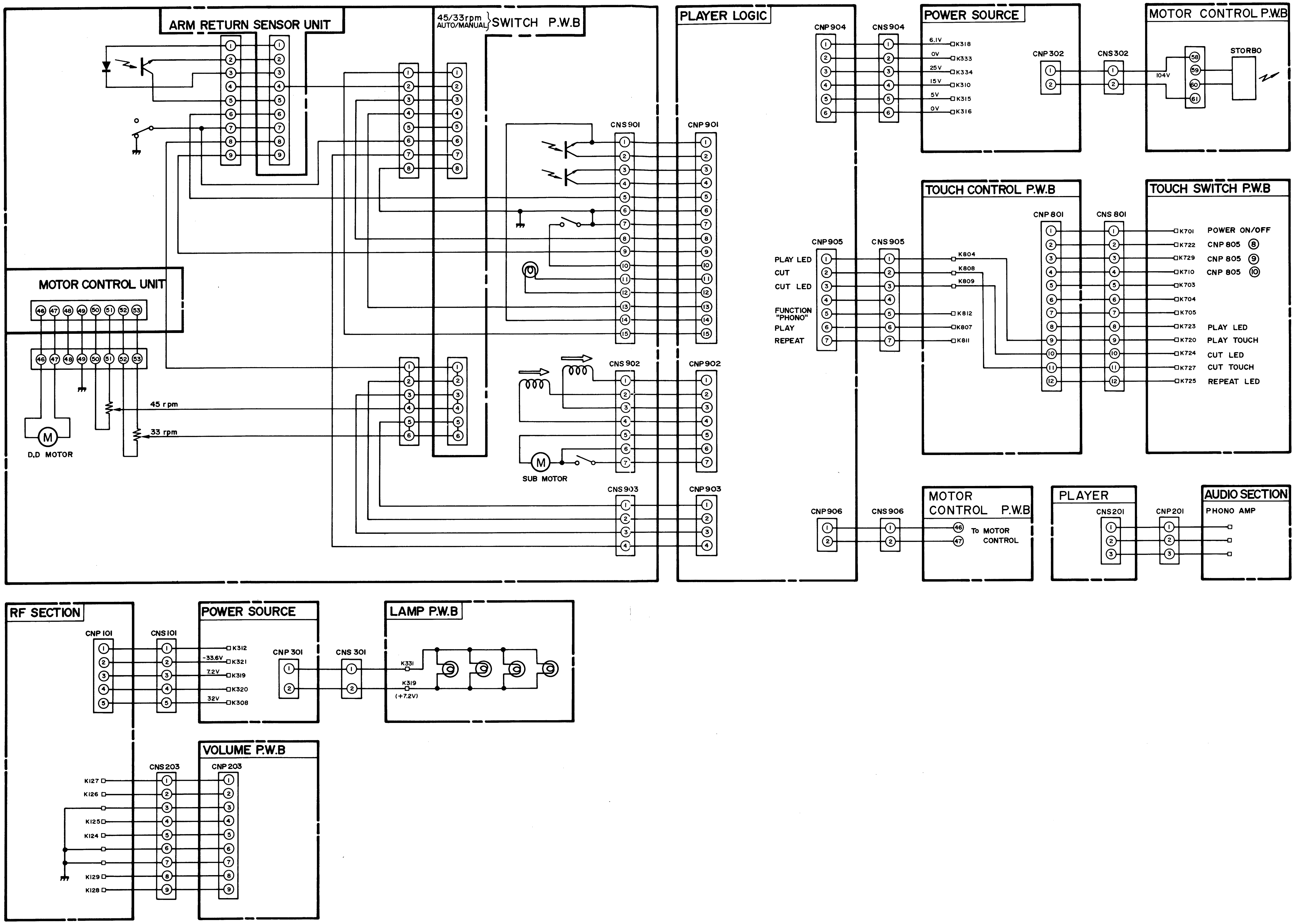

ARM RETURN SENSOR UNIT
45/33rpm AUTO/MANUAL SWITCH P.W.B
PLAYER LOGIC
CNP904
CNS904
POWER SOURCE
6.1V K318
0V K333
25V K334
15V K310
5V K315
0V K316
CNP302
CNS302
MOTOR CONTROL P.W.B
104V
STORBO
CNS901
CNP901
MOTOR CONTROL UNIT
45 rpm
33 rpm
D.D MOTOR
CNS902
CNP902
SUB MOTOR
CNS903
CNP903
TOUCH CONTROL P.W.B
TOUCH SWITCH P.W.B
CNP801
CNS801
CNP905
CNS905
PLAY LED
CUT
CUT LED
FUNCTION "PHONO"
PLAY
REPEAT
K804
K808
K809
K812
K807
K811
K701 POWER ON/OFF
K722 CNP 805 ⑧
K729 CNP 805 ⑨
K710 CNP 805 ⑩
K703
K704
K705
K723 PLAY LED
K720 PLAY TOUCH
K724 CUT LED
K727 CUT TOUCH
K725 REPEAT LED
CNP906
CNS906
MOTOR CONTROL P.W.B
㊻ ㊼ To MOTOR CONTROL
PLAYER
CNS201
CNP201
AUDIO SECTION
PHONO AMP
RF SECTION
CNP101
CNS101
POWER SOURCE
K312
-33.6V K321
7.2V K319
K320
32V K308
CNP301
CNS301
LAMP P.W.B
K331
K319 (+7.2V)
VOLUME P.W.B
CNS203
CNP203
K127
K126
K125
K124
K129
K128

Figure 131–1 CONNECTION GUIDE

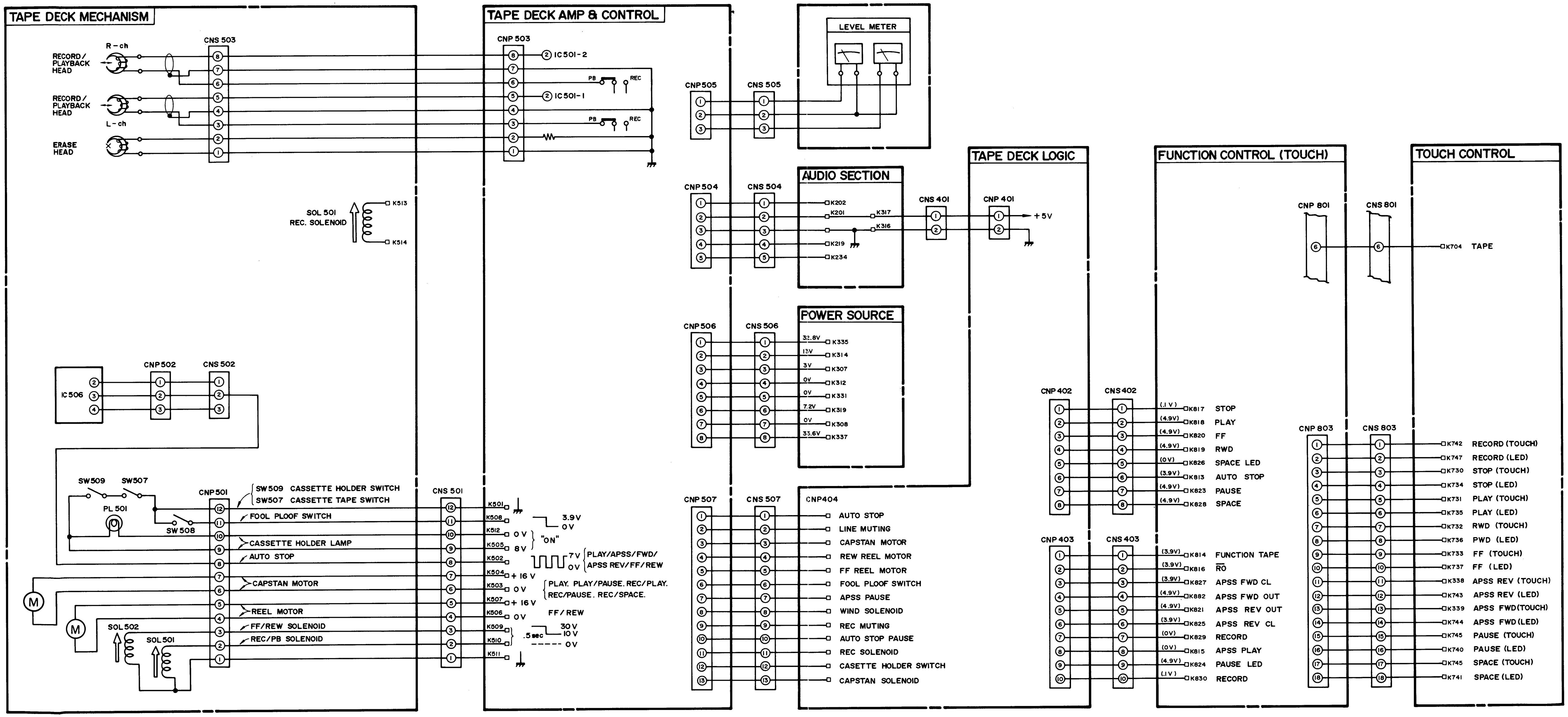

TAPE DECK MECHANISM
CNS 503
R-ch
RECORD/ PLAYBACK HEAD
RECORD/ PLAYBACK HEAD
L-ch
ERASE HEAD
SOL 501
REC. SOLENOID
K513
K514
IC506
CNP502
CNS502
SW509
SW507
PL 501
SW508
CNP501
SW509 CASSETTE HOLDER SWITCH
SW507 CASSETTE TAPE SWITCH
FOOL PLOOF SWITCH
CASSETTE HOLDER LAMP
AUTO STOP
CAPSTAN MOTOR
REEL MOTOR
FF/REW SOLENOID
REC/PB SOLENOID
M
M
SOL502
SOL501
TAPE DECK AMP & CONTROL
CNP 503
IC501-2
IC501-1
PB
REC
PB
REC
CNS 501
K501
K508
K512
K505
K502
K504
K503
K507
K506
K509
K510
K511
3.9V
0V
0 V
8 V
"ON"
7V
0V
PLAY/APSS/FWD/
APSS REV/FF/REW
+ 16 V
0 V
PLAY. PLAY/PAUSE. REC/PLAY.
REC/PAUSE. REC/SPACE.
+ 16 V
0 V
FF/REW
30V
10V
.5sec
0V
CNP505
CNS 505
LEVEL METER
CNP504
CNS 504
AUDIO SECTION
K202
K201
K317
K316
K219
K234
CNS 401
CNP 401
+5V
TAPE DECK LOGIC
CNP506
CNS 506
POWER SOURCE
32.8V K335
13V K314
3V K307
0V K312
0V K331
7.2V K319
0V K308
33.6V K337
CNP507
CNS 507
CNP404
AUTO STOP
LINE MUTING
CAPSTAN MOTOR
REW REEL MOTOR
FF REEL MOTOR
FOOL PLOOF SWITCH
APSS PAUSE
WIND SOLENOID
REC MUTING
AUTO STOP PAUSE
REC SOLENOID
CASETTE HOLDER SWITCH
CAPSTAN SOLENOID
CNP 402
CNS402
CNP 403
CNS 403
FUNCTION CONTROL (TOUCH)
(.1 V) K817 STOP
(4.9V) K818 PLAY
(4.9V) K820 FF
(4.9V) K819 RWD
(0V) K826 SPACE LED
(3.9V) K813 AUTO STOP
(4.9V) K823 PAUSE
(4.9V) K828 SPACE
(3.9V) K814 FUNCTION TAPE
(3.9V) K816 $\overline{\text{RO}}$
(3.9V) K827 APSS FWD CL
(4.9V) K882 APSS FWD OUT
(4.9V) K821 APSS REV OUT
(3.9V) K825 APSS REV CL
(0V) K829 RECORD
(0V) K815 APSS PLAY
(4.9V) K824 PAUSE LED
(.1V) K830 RECORD
CNP 801
CNS 801
CNP 803
CNS 803
TOUCH CONTROL
K704 TAPE
K742 RECORD (TOUCH)
K747 RECORD (LED)
K730 STOP (TOUCH)
K734 STOP (LED)
K731 PLAY (TOUCH)
K735 PLAY (LED)
K732 RWD (TOUCH)
K736 PWD (LED)
K733 FF (TOUCH)
K737 FF (LED)
K338 APSS REV (TOUCH)
K743 APSS REV (LED)
K339 APSS FWD(TOUCH)
K744 APSS FWD (LED)
K745 PAUSE (TOUCH)
K740 PAUSE (LED)
K745 SPACE (TOUCH)
K741 SPACE (LED)

Figure 133–1 CONNECTION GUIDE

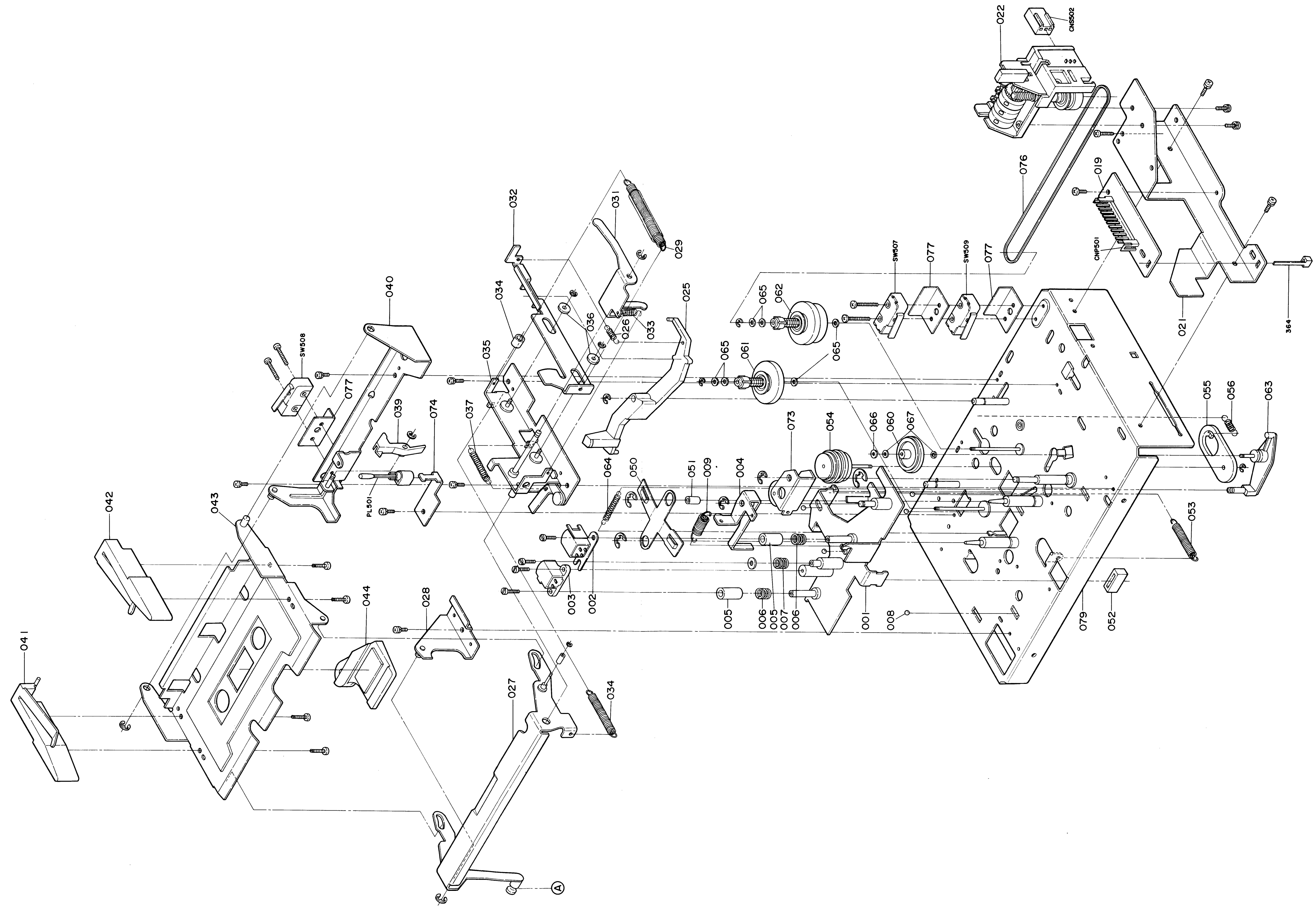

022
CN502
076
019
CNP501
364
021
SW507
077
SW509
077
065
062
065
061
065
055
056
063
073
054
066
060
067
053
052
079
008
001
006
007
005
006
005
004
009
051
050
064
002
003
032
031
029
025
034
036
026
033
035
037
040
039
074
SW508
077
PL501
042
043
044
028
041
027
034
A

Figure 135–1 TAPE DECK MECHANISM EXPLODED TOP VIEW

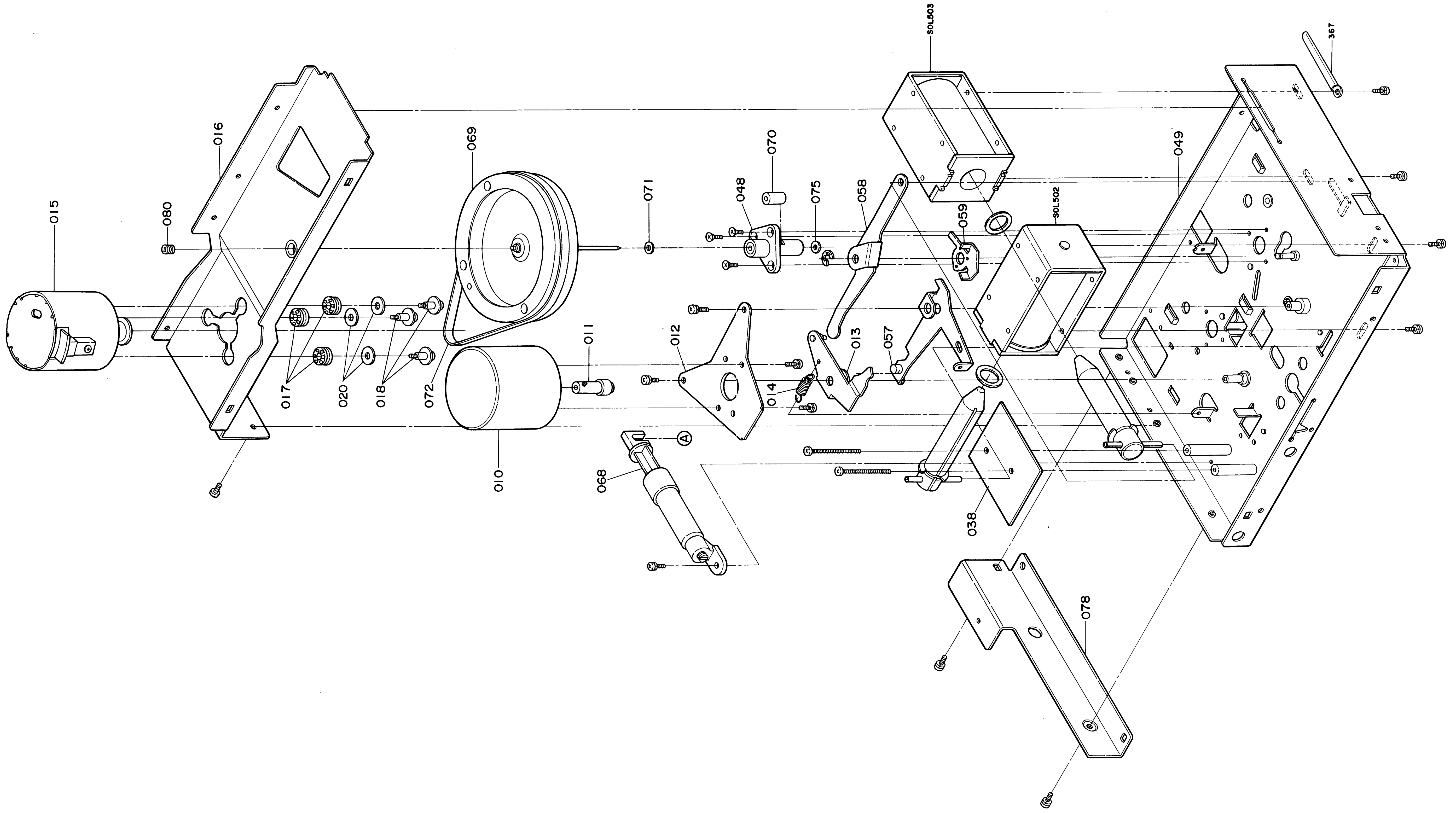

015
080
016
069
072
017
020
018
010
011
012
071
070
048
075
068
A
014
013
058
059
057
SOL503
SOL502
038
078
049
367

Figure 137–1 TAPE DECK MECHANISM EXPLODED BOTTOM VIEW

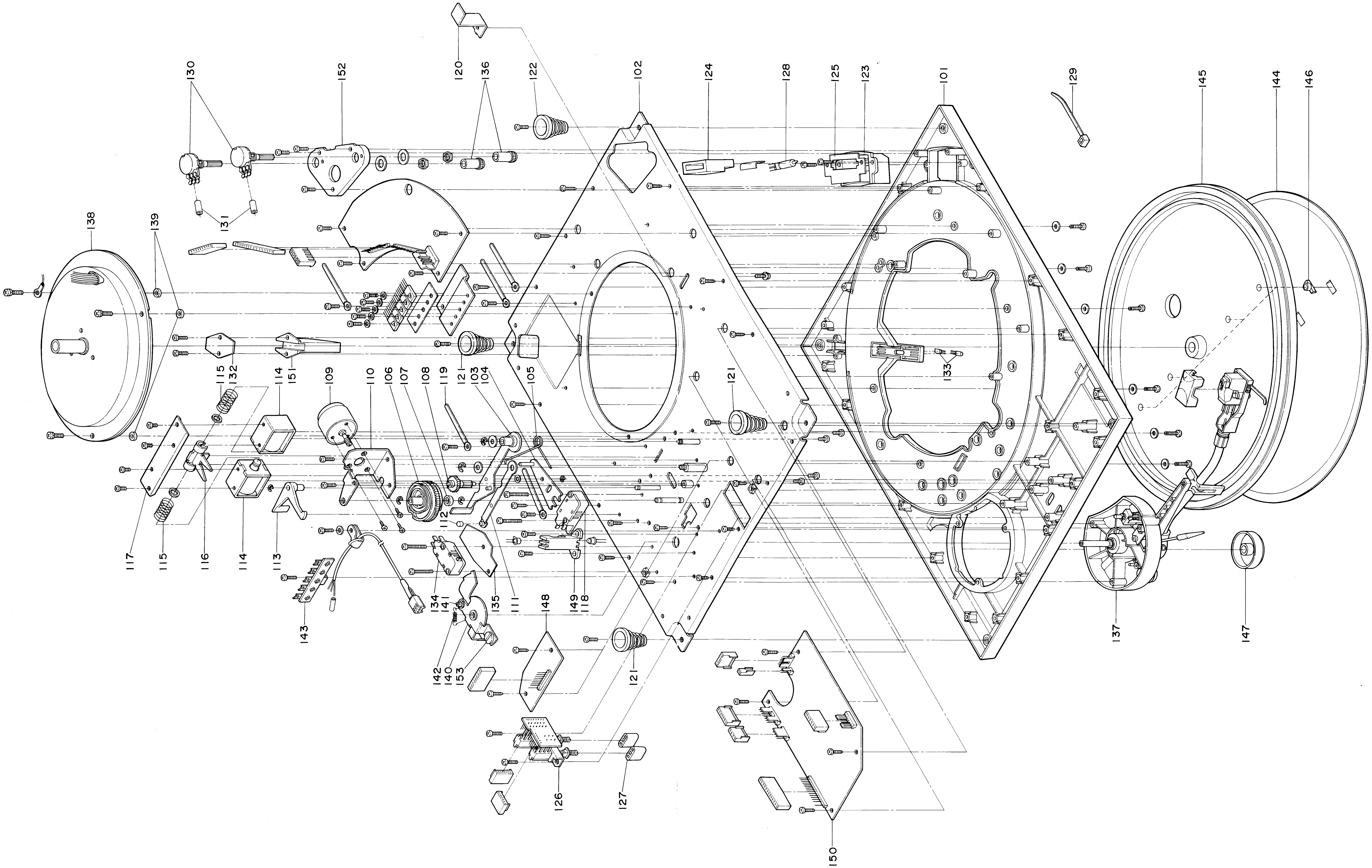

130
152
120
136
122
102
124
128
125
123
101
129
145
144
146
138
139
131
115
132
114
151
109
110
106
107
108
119
121
103
104
105
121
133
117
115
116
114
113
112
143
134
141
135
111
148
149
118
142
140
153
121
126
127
150
137
147

Figure 139–1 PLAYER EXPLODED VIEW

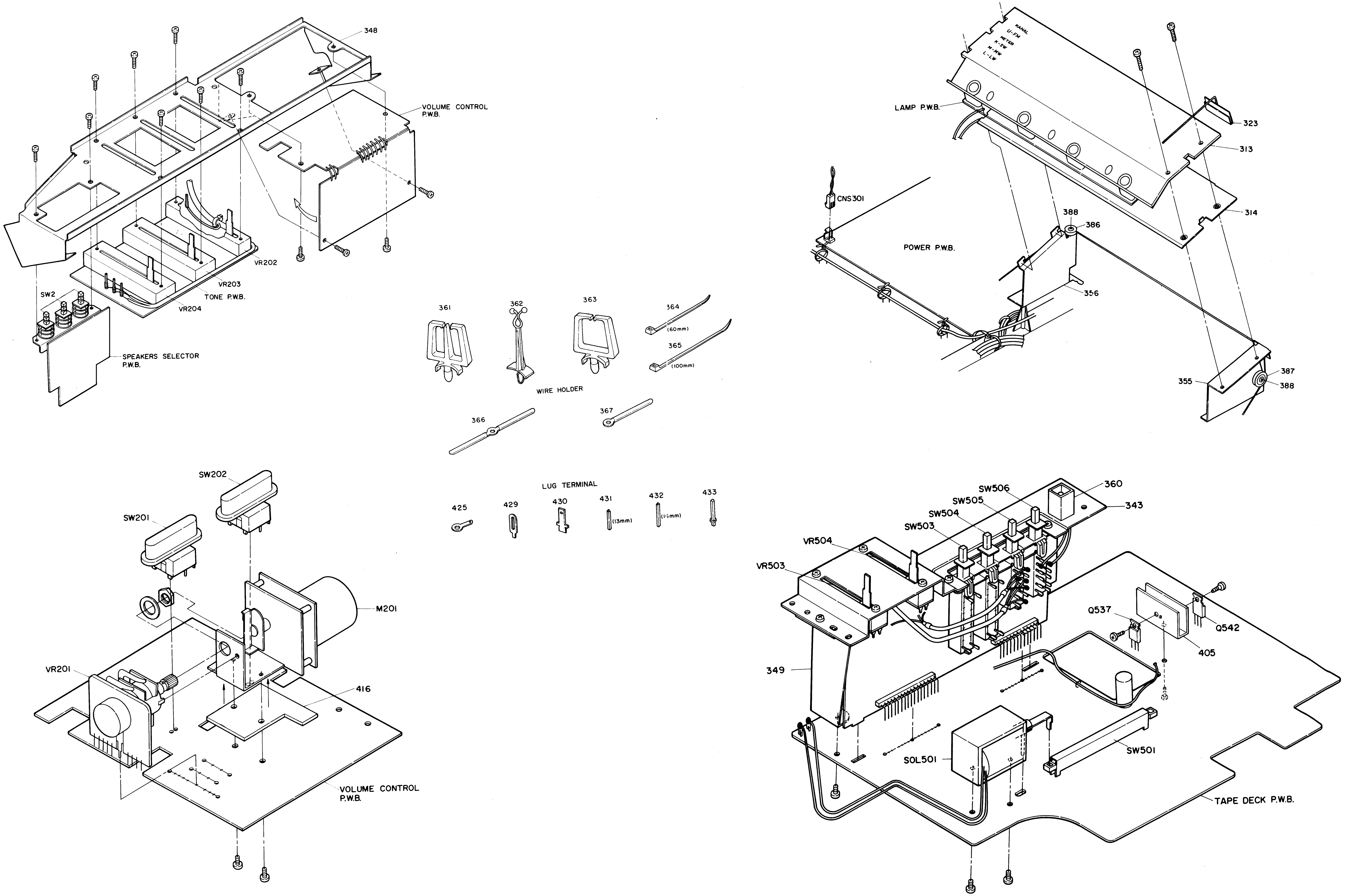

348
VOLUME CONTROL P.W.B.
VR202
VR203
TONE P.W.B.
VR204
SW2
SPEAKERS SELECTOR P.W.B.
361
362
363
364
(60mm)
365
(100mm)
WIRE HOLDER
366
367
LUG TERMINAL
425
429
430
431
(13mm)
432
(15mm)
433
SW202
SW201
M201
VR201
416
VOLUME CONTROL P.W.B.
KANAL
U-FM
METER
K-SW
M-MW
L-LW
LAMP P.W.B.
323
313
314
CNS301
388
386
POWER P.W.B.
356
355
387
388
360
343
SW506
SW505
SW504
SW503
VR504
VR503
Q537
Q542
405
349
SOL501
SW501
TAPE DECK P.W.B.

Figure 141–1 MISCELLANEOUS PARTS GUIDE

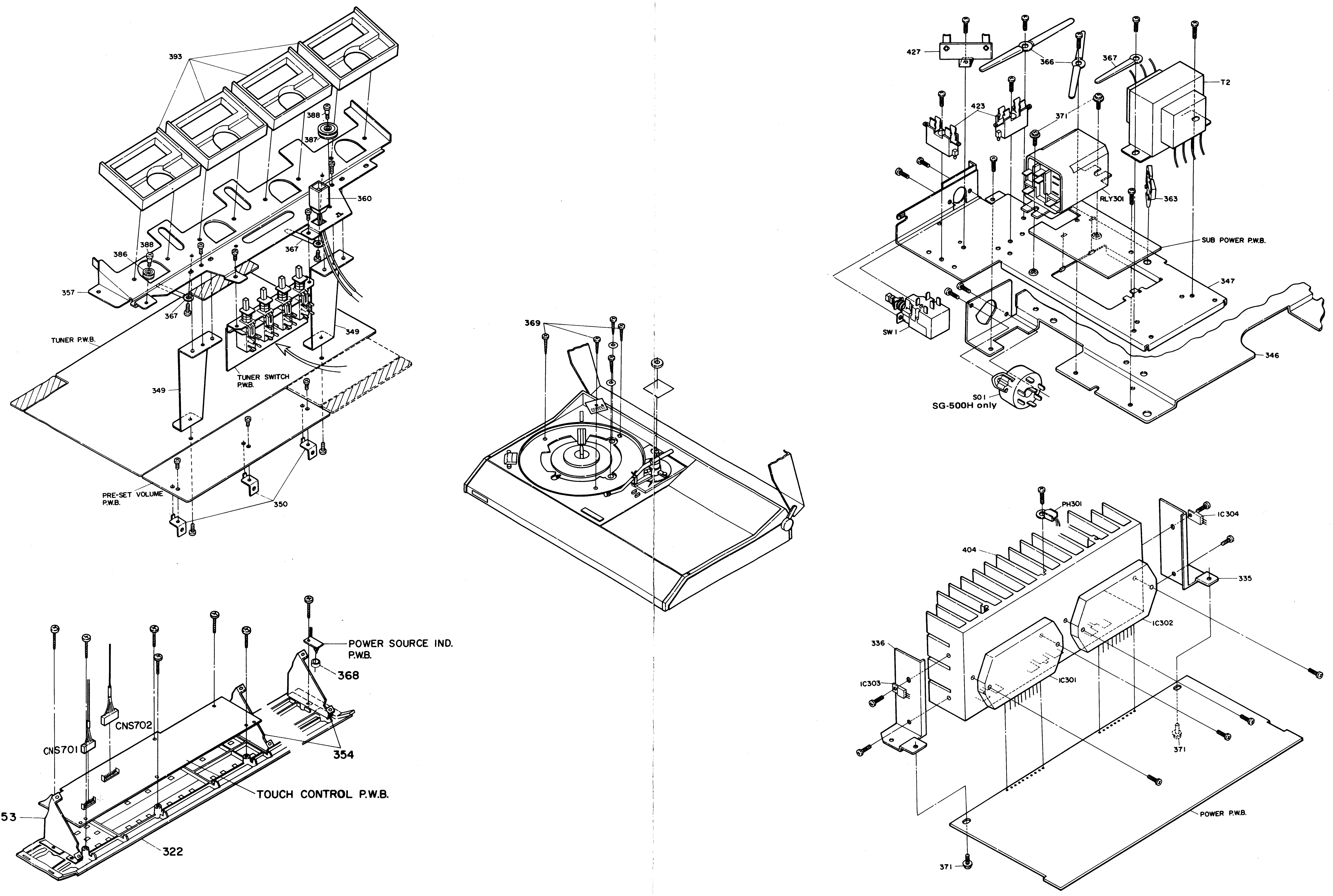

393
388
387
360
386
388
367
357
367
TUNER P.W.B.
349
349
TUNER SWITCH P.W.B.
PRE-SET VOLUME P.W.B.
350
369
427
366
367
T2
423
371
RLY301
363
SUB POWER P.W.B.
347
SW1
346
SO1
SG-500H only
PH301
IC304
404
335
IC302
336
IC303
IC301
371
POWER P.W.B.
371
POWER SOURCE IND. P.W.B.
368
CNS702
CNS701
354
TOUCH CONTROL P.W.B.
353
322

Figure 143–1 MISCELLANEOUS PARTS GUIDE

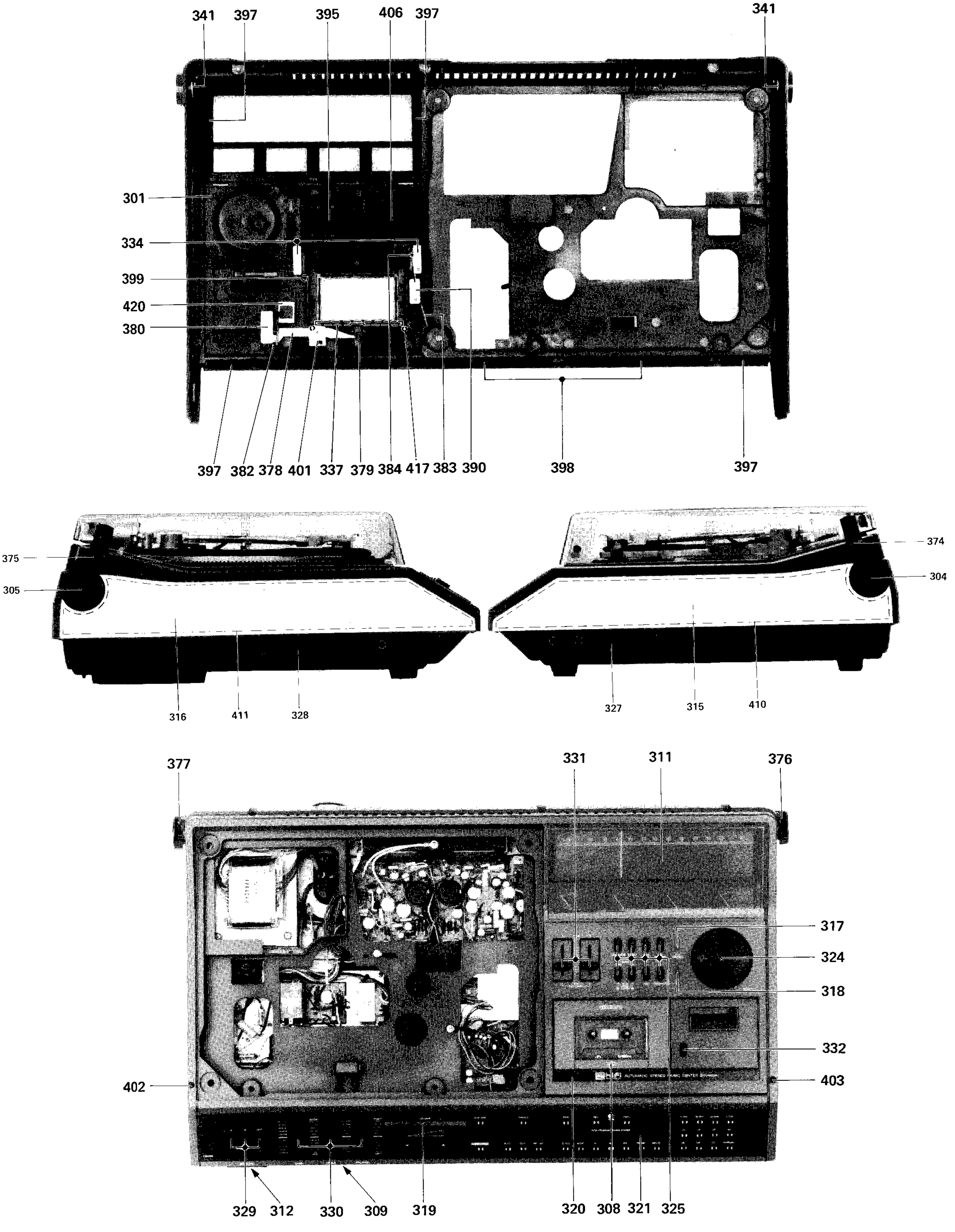

341
397
395
406
397
341
301
334
399
420
380
397
382
378
401
337
379
384
417
383
390
398
397
375
305
316
411
328
374
304
327
315
410
377
331
311
376
317
324
318
332
402
403
329
312
330
309
319
320
308
321
325

Figure 145–1 MISCELLANEOUS PARTS GUIDE

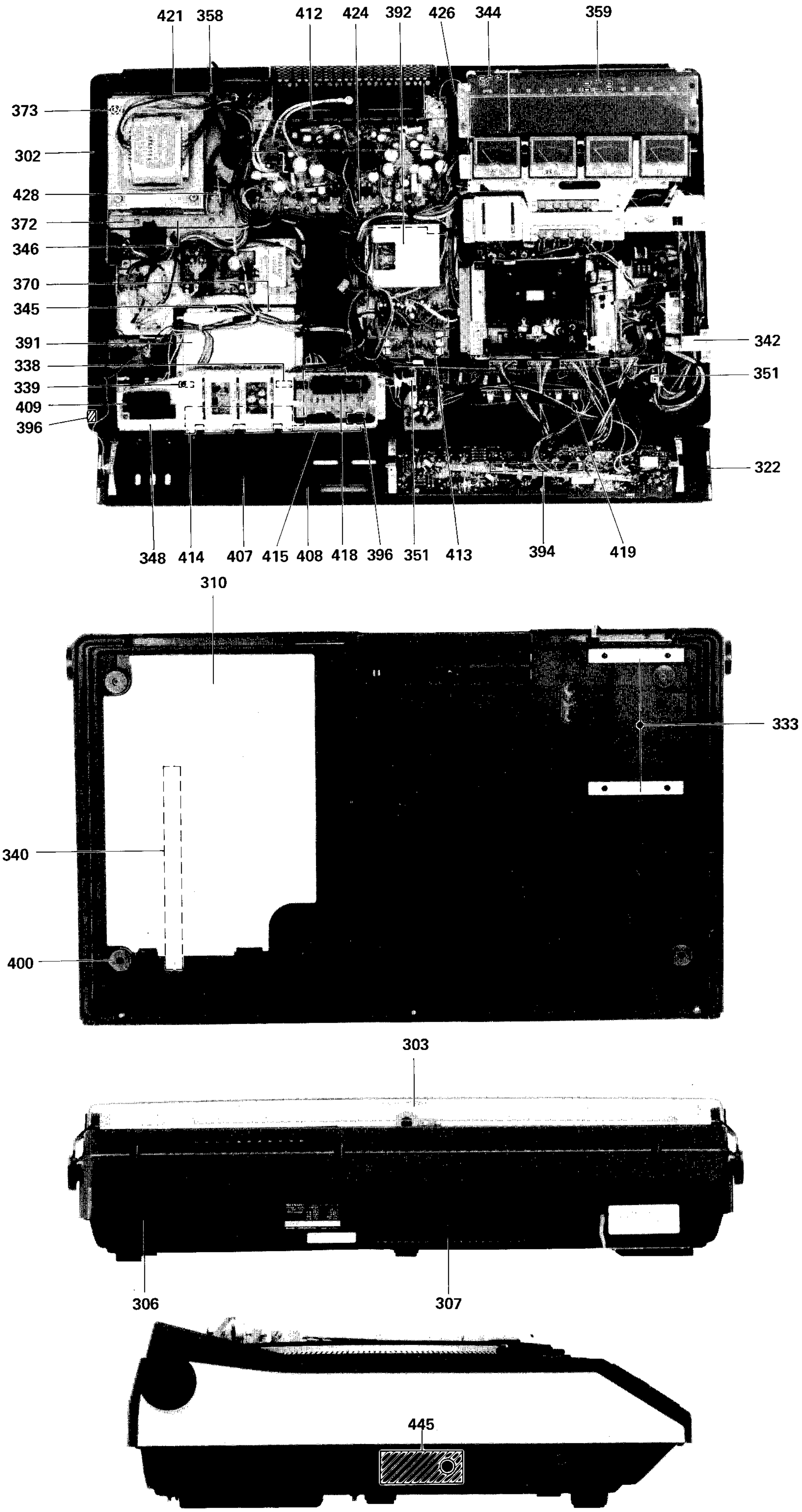

421
358
412
424
392
426
344
359
373
302
428
372
346
370
345
391
338
339
409
396
342
351
322
348
414
407
415
408
418
396
351
413
394
419
310
333
340
400
303
306
307
445

Figure 146–1 MISCELLANEOUS PARTS GUIDE

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

- SG-500E parts are refer to page 160 (DIFFERENCE BETWEEN SG-500H AND SG-500E)

INTEGRATED CIRCUITS

REF. NO.	PART NO.	DESCRIPTION	CODE
IC101	RH-IX1005AFZZ	FM IF Amp. and Detector (HA1137)	AT
IC102	RH-IX1007AFZZ	FM P.L.L. MPX. Demodulator (LA3350)	AQ
IC103	RH-IX1032AFZZ	AM CONV./IF/Detector (HA1151)	AK
IC201, IC202	RH-IX0437AGZZ	PHONO RIAA Equalizer Amp. (TA7129P)	AH
IC203, IC204	RH-IX0437AGZZ	Mic. Pre-amp. (TA7129P)	AH
IC205, IC206	RH-IX0437AGZZ	Tone Control Amp. (TA7129P)	AH
IC301, IC302	RH-IX1089AFZZ	Power Amp. (STK-082)	BA
IC303, IC304	RH-IX1103AFZZ	DC 5V Fixed Voltage Regulator (TA78005P)	AK
IC305	RH-IX1048AFZZ	33V Zener (μPC574J)	AH
IC381	RH-IX1104AFZZ	DC 15V Fixed Voltage Regulator (TA78015P)	AK
IC401, IC402	RH-IX1096AFZZ	4 NAND Gate, Tape Logic Section (HD7420)	AF
IC403, IC404	RH-IX1025AFZZ	2 NAND Gate, Tape Logic Section (HD7400)	AG
IC405, IC406	RH-IX1026AFZZ	2 NOR Gate, Tape Logic Section (HD7402)	AG
IC407	RH-IX1027AFZZ	Hex Inverter, Tape Logic Section (HD7404)	AG
IC408	RH-IX1102AFZZ	3 NOR Gate, Tape Logic Section (TC4025P)	AF
IC409	RH-IX1100AFZZ	2 NOR Gate, Tape Logic Section (TC4001P)	AF
IC410, IC411	RH-IX1099AFZZ	2 NAND Gate, Tape Logic Section (TC4011P)	AF
IC412	RH-IX1100AFZZ	2 NOR Gate, Tape Logic Section (TC4001P)	AF
IC413, IC414	RH-IX1098AFZZ	Hex Inverter, Tape Logic Section (TC4049)	AK
IC415	RH-IX1090AFZZ	LSI, Tape Control (TC9121P)	AX
IC501, IC502	RH-IX0437AGZZ	Playback Equalizer Amp. (TA7129P)	AH
IC503, IC504	VHILM1011N/-1	Dolby NR Processor (LM1011N)	AR
IC505	RH-IX0416AGZZ	APSS Limiter Amp. (BA301)	AH
IC601	RH-IX1099AFZZ	FM/SW/MW/LW Muting Control (TC4011P)	AF
IC602	RH-IX1098AFZZ	FM/SW/MW/LW Muting Control (TC4049P)	AK
IC701	RH-IX1091AFZZ	Touch Sensor, PHONO/TAPE/MIC/AUX (M51232P)	AQ
IC702	RH-IX1091AFZZ	Touch Sensor, FM/SW/MW/LW (M51232P)	AQ
IC703	VHIHA1194//1F	Touch Sensor, FM Pre-set (HA1194)	AS
IC704	RH-IX1046AFZZ	Touch Sensor, FM Pre-set (HA1190)	AP
IC801	RH-IX1093AFZZ	Touch Sensor, Power ON/OFF (M54621L)	AK
IC802	RH-IX1026AFZZ	2 NOR Gate, Touch Control Section (M53202P)	AG
IC803	RH-IX1094AFZZ	Hex Buffer, Touch Control Section (HD7407P)	AF
IC804	RH-IX1027AFZZ	Hex Inverter, Touch Control Section (M53204P)	AG
IC805	RH-IX1026AFZZ	2 NOR Gate, Touch Control Section (M53202P)	AG
IC806	RH-IX1092AFZZ	Touch Sensor, PHONO/PLAY CUT (M54620P)	AQ
IC807	RH-IX1093AFZZ	Touch Sensor, PHONO REPEAT (M54621L)	AK
IC808	RH-IX1091AFZZ	Touch Sensor, TAPE STOP/PLAY/RWD/FF (M51232P)	AQ
IC809	RH-IX1092AFZZ	Touch Sensor, TAPE REV APSS/FWD APSS/PAUSE/SPACE (M54620P)	AQ
IC810	RH-IX1093AFZZ	Touch Sensor, TAPE REC	AK
IC901	RH-IX1100AFZZ	2 NOR Gate, Player Logic Section (TC4001)	AF
IC902	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC903	91ZSN7404	Hex Inverter, Player Logic Section (SN7404)	AH
IC905	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC906	RH-IX1097AFZZ	2 NAND Gate, Player Logic Section (SN7408)	AH
IC907, IC908	91ZSN7402	2 NOR Gate, Player Logic Section (SN7402)	AH
IC909	RH-IX1097AFZZ	2 AND Gate, Player Logic Section (SN7408)	AH
IC910	91ZSN7402	2 NOR Gate, Player Logic Section (SN7402)	AH
IC911	91ZSN7400	2 NAND Gate, Player Logic Section (SN7400)	AH
IC912	91ZSN7433	2 NOR Buffer, Player Logic Section (SN7433)	AK
IC913	91ZSN7404	Hex Inverter, Player Logic Section (SN7404)	AH
IC914	RH-IX1097AFZZ	2 AND Gate, Player Logic Section (SN7408)	AH
IC1001	91ZμPC151A	Arm Return Sensor (μPC151A) (IC1)	AQ
IC1101	91ZμPC151A	OP. Amp. (μPC151A) (IC31)	AQ

TRANSISTORS

REF. NO.	PART NO.	DESCRIPTION	CODE
Q101	VS2SC460-B/-1	FM IF Amp. (2SC460B)	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
Q102	VS2SC458-B/-1	FM Muting (2SC458B)	AC
Q104	VS2SA673-C/-1	Stereo Indicator Drive (2SA673C)	AE
Q105	VS2SC461-C/-1	AM Local Oscillator (2SC461C)	AC
Q106	VS2SC458AC/-1	FM Pre-set Meter Drive (2SC458AC)	AC
Q107, Q108	VS2SC1815GR-1	Output Level Transduser (2SC1815GR)	AC
Q201, Q202	VS2SA673-B/-1	Volume Control Motor Drive (2SA673B)	AD
Q203, Q204	VS2SC1213-B-1	Volume Control Motor Drive (2SC1213B)	AD
Q205, Q206	VS2SC1815GR-1	Volume End Detector (2SC1815GR)	AC
Q207, Q208	VS2SC1345-E-1	Function Drive (2SC1345E)	AD
Q301, Q302	VS2SC1815GR-1	Muting Control (2SC1815GR)	AC
Q303	VS2SC1815GR-1	Muting Control (2SC1815GR)	AC
Q304	VS2SC1815GR-1	Muting Discharge (2SC1815GR)	AC
Q305	VS2SA872-E/-1	Voltage Regulator (2SA872E)	AE
Q306	VS2SC1162WC-1	Ripple Filter (2SC1162WC)	AF
Q307	VS2SC1419-K1F	Ripple Filter (2SC1419B)	AG
Q308	VS2SA561-Y/-1	Power Switching (2SA561Y)	AD
Q309	VS2SC1419-K1F	Voltage Regulator (2SC1419B)	AG
Q401	VS2SC1815GR-1	Space Indicator Drive (2SC1815GR)	AC
Q402	VS2SC1815GR-1	Line Muting Drive (2SC1815GR)	AC
Q403	VS2SC1815GR-1	Line Muting Drive (2SC1815GR)	AC
Q404	VS2SC1815GR-1	Inverter (2SC1815GR)	AC
Q405	VS2SC1815GR-1	Inverter (2SC1815GR)	AC
Q406	VS2SC1815GR-1	AND Circuit (2SC1815GR)	AC
Q501, Q502	VS2SC1815GR-1	Line Muting (2SC1815GR)	AC
Q503	VS2SC458-D/-1	ALC Drive (2SC458D)	AC
Q504	VS2SC1583G-1F	ALC Drive (2SC1583G)	AF
Q505, Q506	VS2SC1775E/-1	Record Pre-Amp. (2SC1775E)	AD
Q507, Q508	VS2SC458-D/-1	Level Meter Drive (2SC458D)	AC
Q509, Q510, Q511, Q512	VS2SC1815GR-1	Line Muting (2SC1815GR)	AC
Q513, Q514	VS2SC458-D/-1	Record Equalizer Amp. (2SC458D)	AC
Q515, Q516	VS2SC1214-C-1	Bias OSC (2SC1214C)	AD
Q517	VS2SD235-Y/-1	Voltage Regulator (2SD235Y)	AG
Q518, Q519, Q520	VS2SC458-D/-1	Level Comparison (2SC458D)	AC
Q521, Q522, Q523	VS2SC458-D/-1	Auto Stop Control (2SC458D)	AC
Q524	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC
Q525	VS2SC1162WC-1	Reel Motor Drive (2SC1162WC)	AF
Q526, Q527	VS2SA715WCP-3	Reel Motor Drive (2SA715WC)	AF
Q528	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC
Q529	VS2SC1162WC-1	Reel Motor Drive (2SC1162WC)	AF
Q530	VS2SC1815GR-1	Capstan Motor Drive (2SC1815GR)	AC
Q531	VS2SC1214-C-1	Capstan Motor Drive (2SC1214C)	AD
Q532	VS2SD235-Y/-1	REC/PB and FF/RWD Solenoid Drive (2SD235Y)	AG
Q533, Q534	VS2SC1815GR-1	REC/PB and FF/RWD Solenoid Drive (2SC1815GR)	AC
Q535	VS2SA755-C/-1	FF/RWD Solenoid Drive (2SA755C)	AH
Q536	VS2SC1815GR-1	FF/RWD Solenoid Drive (2SC1815GR)	AC
Q537	VS2SD235-Y/-1	REC/PB Switch Solenoid Drive (2SD235Y)	AG
Q538	VS2SC1815GR-1	REC/PB Switch Solenoid Drive (2SC1815GR)	AC
Q539	VS2SA755-C/-1	REC/PB Switch Solenoid Drive (2SA755C)	AH
Q540, Q541	VS2SC1815GR-1	REC/PB Switch Solenoid Drive (2SC1815GR)	AC
Q542	VS2SD235-Y/-1	Voltage Regulator (2SD235Y)	AG
Q543	VS2SC1815GR-1	FF/RWD Solenoid Drive (2SC1815GR)	AC
Q544	VS2SC1815GR-1	REC/PB Solenoid Drive (2SC1815GR)	AC
Q545	VS2SA755-C/-1	REC/PB Solenoid Drive (2SA755C)	AH
Q546	VS2SC1815GR-1	REC/PB Solenoid Drive (2SC1815GR)	AC
Q547	VS2SC1815GR-1	Reel Motor Drive (2SC1815GR)	AC
Q548	VS2SC1815GR-1	APSS Muting (2SC1815GR)	AC
Q601, Q602, Q603	VS2SC945AK/-1	Muting Control (2SC945AK)	AB
Q701, Q702, Q703, Q704	VS2SC1815GR-1	Constant Current Circuit (2SC1815GR)	AC
Q801, Q802, Q803, Q804	VS2SC1815GR-1	Function Selector Switching (2SC1815GR)	AC
Q805, Q806, Q807, Q808, Q809	VS2SA733-P/-1	Tuner +B Switching (2SA733P)	AD
Q810	VS2SC1815GR-1	Function Selector Switching (2SC1815GR)	AC
Q811	VS2SA893-E/-1	FM Pre-set Muting (2SA893E)	AD
Q812	VS2SC1815GR-1	Touch Control Section (2SC1815GR)	AC
Q813	VS2SC1815GR-1	Touch Sensor Drive (2SC1815GR)	AC
Q814, Q815, Q816, Q817	VS2SC1815GR-1	Constant Current Circuit (2SC1815GR)	AC
Q818	VS2SC1815GR-1	Touch Control Section (2SC1815GR)	AC
Q819	VS2SC1213-C-3	APSS Indicator Drive (2SC1213C)	AD

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
Q820	VS2SC1213-C-3	REV Indicator Drive (2SC1213C)	AD
Q821	VS2SC1213-C-3	FWD Indicator Drive (2SC1213C)	AD
Q822, Q823	VS2SC1815GR-1	Multi-Vibrator, APSS Indicator (2SC1815GR)	AC
Q824	VS2SA733-P/-1	Current Source (2SA733P)	AD
Q825, Q826	VS2SC1815GR-1	Inverter (2SC1815GR)	AC
Q827	VS2SC1815GR-1	Power Reset Circuit (2SC1815GR)	AC
Q901, Q902	VS2SC1815GR-1	Record Size Detect Amp. (2SC1815GR)	AF
Q903, Q904	VS2SC1815GR-1	Inverter (2SC1815GR)	AF
Q905	VS2SA733-P/-1	Relay Drive (2SA733P)	AD
Q906, Q907	VS2SC1213-C-1	EP/LP Solenoid Drive (2SC1213C)	AF
Q908	VS2SA673-C/-1	Arm Control Motor Drive (2SA673C)	AD
Q909	VS2SA673-C/-1	Motor (DDM) Drive (2SA673C)	AD
Q910	VS2SB647-C/-1	Motor (DDM) Drive (2SB647C)	AG
Q911, Q912, Q913, Q914	VS2SC1815GR-1	Inverter (2SC1815GR)	AF
Q1001	91Z2SC945	Return Sensor Section (2SC945), (TR1)	AF
Q1002	91Z2SC945	Return Sensor Section (2SC945), (TR2)	AF
Q1003	91Z2SC945	Return Sensor Section (2SC945), (TR3)	AF
Q1004	91Z2SC945	Return Sensor Section (2SC945), (TR4)	AF
Q1101	91Z2SA641	Amplifier (2SA641), (X31)	AG
Q1102	91Z2SA641	Amplifier (2SA641), (X32)	AG
Q1103	91Z2SC945	Amplifier (2SC945), (X33)	AF
Q1104	91Z2SC945	Amplifier (2SC945), (X34)	AF
Q1105	91Z2SC945	Frequency Multiple Circuit (2SC945), (X35)	AF
Q1106	91Z2SC945	Saw Tooth Wave Generator (2SC945), (X36)	AF
Q1107	91Z2SC945	Comparator Circuit (2SC945), (X37)	AF
Q1108	91Z2SC945	Comparator Circuit (2SC945), (X38)	AF
Q1109	91Z2SC641	Comparator Circuit (2SC641), (X39)	AG
Q1110	91Z2SC945	Amplifier (2SC945), (X40)	AF
Q1111	91Z2SB605	Amplifier (2SB605), (X41)	AH
Q1112	91Z2SC733	Drive Circuit (2SC733), (X42)	AF
Q1113	91Z2SC733	Drive Circuit (2SC733), (X43)	AF
Q1114	91Z2SC733	Drive Circuit (2SC733), (X44)	AF
Q1115	91Z2SC733	Drive Circuit (2SC733), (X45)	AF
Q1116	91Z2SC945	Drive Circuit (2SC945), (X46)	AF
Q1117	91Z2SC945	Drive Circuit (2SC945), (X47)	AF
Q1118	91Z2SC945	Drive Circuit (2SC945), (X48)	AF
Q1119	91Z2SC945	Drive Circuit (2SC945), (X49)	AF
Q1120	91Z2SC1449L	Drive Circuit (2SC1449L), (X50)	**
Q1121	91Z2SC1449L	Drive Circuit (2SC1449L), (X51)	**
Q1122	91Z2SC1449L	Drive Circuit (2SC1449L), (X52)	**
Q1123	91Z2SC1449L	Drive Circuit (2SC1449L), (X53)	**
Q1124	91Z2SC1449L	Constant Voltage Circuit (2SC1449L), (X54)	**
Q1125	91Z2SC1573	Neon Lamp Drive (2SC1573), (X55)	AH

DIODES

REF. NO.	PART NO.	DESCRIPTION	CODE
D101, D102	VHD1N60////-1	Rectifier for AGC (1N60)	AB
D103	VHD1S1555V/1G	FM Muting (1S1555)	AB
D104	VHD1S1555V/1G	Level Shift, Signal Strength Meter (1S1555)	AB
D105	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D106, D107	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
D108, D109, D110	VHD3A243A//-1	Band Selector Switching (3A243A)	AC
D111, D112, D113, D114	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
D115	VHD3A243A//-1	Band Selector Switching (3A243A)	AC
D116, D117	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
D118	VHD3A243A//-1	Band Selector Switching (3A243A)	AC
D119, D120, D121, D122, D123, D124, D125, D126, D127, D128, D129, D130, D131, D132, D133, D134	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
D135, D136	VHD10E1////-1	Temperature Regulator (10E1)	AC
D137, D138, D139, D140	VHD1S1555V/1G	Temperature Regulator (1S1555)	AB
D141	VHD1N60////-1	Temperature Regulator (1N60)	AB
D142, D143, D144, D145, D146, D147, D148	VHD1S1555V/1G	Temperature Regulator and Reverse Current Protector (1S1555)	AB
D149	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
D150	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D152, D153	VHD1S1555V/1G	Band Selector Switching (1S1555)	AB
D201, D202, D203, D204, D205, D206, D207, D208, D209, D210	VHD1S1555V/1G	Fuction Selector Switching (1S1555)	AB
D211, D212, D213, D214, D215	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB
D223	VHD1S1555V/1G	Volume Indicator Drive (1S1555)	AB
D224, D225	VHD1S2076//-1	Protector, Motor Drive Circuit (1S2076)	AB
D226, D227	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D301	VHD1S1555V/1G	Protector, Transistor Q301/ Q302 (1S1555)	AB
D302	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D303	VHD1S1555V/1G	Protector, Transistor Q304 (1S1555)	AB
D304, D305, D306, D307, D308	VHD10E1////-1	Rectifier (10E1)	AC
D309, D310, D311, D312	VHDSR3AM-4/-1	Rectifier (SR3AM-4)	AF
D313	VHD10E1////-1	Rectifier (10E1)	AC
D314	VHVHV46-G//-1	Temperature Regulator (HV46)	AC
D315, D316, D317, D318, D319, D320, D321, D322, D323, D324, D325, D326, D327, D328, D329	VHD10E1////-1	Rectifier (10E1)	AC
D330	VHD1S1555V/1G	Protector, Transistor Q301/ Q302 (1S1555)	AB
D331	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D381, D382	VHD10E1////-1	Rectifier (10E1)	AC
D383	VHD10E1////-1	Surge Absorber (10E1)	AC
D401	VHD1S1555V/1G	AND Circuit (1S1555)	AB
D402, D403, D404, D405, D406, D407, D408, D409, D410, D411	VHD1S1555V/1G	AND Circuit (1S1555)	AB
D412, D413, D414, D415 D416, D417, D418	VHD1S1555V/1G	OR Circuit (1S1555)	AB
D419, D420, D421, D422, D423, D424	VHD1S1555V/1G	AND Circuit (1S1555)	AB
D503, D504	VHD1N60-PP/1G	ALC Drive (1N60PP)	AB
D505, D506, D507, D508	VHD1N60////-1	Level Meter Drive (1N60)	AB
D509, D510	VHD1S1555V/1G	Line Muting (1S1555)	AB
D511, D512	VHD1N60////-1	Protector, Reverse Current (1N60)	AB
D513, D514, D515, D516, D517	VHD1S1555V/1G	Auto Stop Control Circuit (1S1555)	AB
D518	VHD10E1////-1	REC/PB and FF/RWD Solenoid Drive (10E1)	AC
D519	VHD1S1555V/1G	REC/PB and FF/RWD Solenoid Drive (1S1555)	AB
D521	VHD10E1////-1	Surge Absorber (10E1)	AC
D522	VHD10E1////-1	REC/PB Switch Solenoid Drive (10E1)	AC
D523, D524	VHD1S1555V/1G	REC/PB Switch Solenoid Drive (1S1555)	AB
D525	VHD10E1////-1	Surge Absorber (10E1)	AC
D526	VHD10E1////-1	REC/PB and FF/RWD Solenoid Drive (10E1)	AC
D527	VHD1S2473//-1	Reel Motor Drive (1S2473)	AB
D529	VHD10E1////-1	Surge Absorber (10E1)	AC
D530	VHD1S1555V/1G	Record Muting (1S1555)	AB
D680, D681	VHD1S1555V/1G	Muting Control (1S1555)	AB
D801	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB
D802, D803, D804	VHD1S1555V/1G	Level Shift (1S1555)	AB
D805, D806, D807	VHD1S1555V/1G	OR Circuit (1S1555)	AB
D808, D809, D810	VHD1S1555V/1G	Level Shift (1S1555)	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
D811, D812 D813	VHD1S1555V/1G	Protector, Reverse Current (1S1555)	AB
D814, D815	VHD1S1555V/1G	OR Circuit (1S1555)	AB
D816	VHD1S1555V/1G	Level Shift (1S1555)	AB
D818, D819	VHD1S1555V/1G	OR Circuit (1S1555)	AB
D820	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB
D901, D902	VHD1S1555V/1G	Surge Absorber (1S1555)	AB
D903, D904	VHD10E1////-1	Surge Absorber (10E1)	AC
D905, D906	VHD1S1555V/1G	Discharge Circuit (1S1555)	AB
D1001	91Z1S953	Protector, Reverse Current (1S953) (X2)	AE
D1002	91Z1S953	Protector, Reverse Current (1S953) (X3)	AE
D1101	91ZMV-12	Rference Voltage Circuit (MV-12) (D31)	AE
D1102	91Z1S953	Drive Circuit (1S953) (D32)	AE
D1103	91Z1S953	Drive Circuit (1S953) (D33)	AE
ZD301	VHEWZ-150//1F	15V Zener (WZ150)	AC
ZD302	VHEHZ12-BBK-1	12V Zener (HZ12B)	AD
ZD501	VHEHZ20////-1	DC 20V Fixed Voltage Regulator (HZ20)	AD
ZD503	VHEXZ-090//-1	DC 9V Fixed Voltage Regulator (WZ-090)	AD
ZD504	VHEWZ-115//-1	DC 11.5V Fixed Voltage Regulator (WZ-115)	AC
ZD801	VHEWZ-050//-1	DC 5V Fixed Voltage Regulator (WZ-050)	AC
ZD901	VHEBZ-061//-1	DC 6V Fixed Voltage Regulator (BZ-061)	AC
ZD1001	91ZRD7.5EC	DC 7.5V Zener (RD7.5EC), (X1)	**
ZD1101	91ZRD13EB	DC 13V Zener (RD13EB), (ZD31)	**

LED (Light Emitting Diode)

D216, D217, D218, D219, D220, D221, D222	RH-PX1008AFZZ	Volume Indicator (GL-9PR2)	AD
D384	VHPGL3AR2//-1	Power Source Indicator (GL3AR2)	AD
D701	RH-PX1006AFZZ	Touch Switch with Indicator, Stand-by (Red)	AH
D702	RH-PX1007AFZZ	Touch Switch with Indicator, MIC/AUX (Green)	AH
D703	RH-PX1007AFZZ	Touch Switch with Indicator, PHONO (Green)	AH
D704	RH-PX1007AFZZ	Touch Switch with Indicator, TAPE (Green)	AH
D705	RH-PX1007AFZZ	Touch Switch with Indicator, FM (Green)	AH
D706	RH-PX1007AFZZ	Touch Switch with Indicator, SW (Green)	AH
D707	RH-PX1007AFZZ	Touch Switch with Indicator, MW (Green)	AH
D708	RH-PX1007AFZZ	Touch Switch with Indicator, LW (Green)	AH
D709	RH-PX1006AFZZ	Touch Switch with Indicator, U1 (Red)	AH
D710	RH-PX1006AFZZ	Touch Switch with Indicator, U2 (Red)	AH
D711	RH-PX1006AFZZ	Touch Switch with Indicator, U3 (Red)	AH
D712	RH-PX1006AFZZ	Touch Switch with Indicator, U4 (Red)	AH
D713	RH-PX1006AFZZ	Touch Switch with Indicator, U5 (Red)	AH
D714	RH-PX1006AFZZ	Touch Switch with Indicator, U6 (Red)	AH
D715	RH-PX1006AFZZ	Touch Switch with Indicator, U7 (Red)	AH
D716	RH-PX1006AFZZ	Touch Switch with Indicator, MANUAL (Red)	AH
D717	RH-PX1006AFZZ	Touch Switch with Indicator, PLAY (Red)	AH
D718	RH-PX1006AFZZ	Touch Switch with Indicator, CUT (Red)	AH
D719	RH-PX1006AFZZ	Touch Switch with Indicator, REPEAT (Red)	AH
D720	RH-PX1006AFZZ	Touch Switch with Indicator, STOP (Red)	AH
D721	RH-PX1006AFZZ	Touch Switch with Indicator, PLAY (Red)	AH
D722	RH-PX1006AFZZ	Touch Switch with Indicator, RWD (Red)	AH
D723	RH-PX1006AFZZ	Touch Switch with Indicator, FF (Red)	AH
D724	RH-PX1007AFZZ	Touch Switch with Indicator, APSS REV (Green)	AH
D725	RH-PX1007AFZZ	Touch Switch with Indicator, APSS FWD (Green)	AH
D726	RH-PX1006AFZZ	Touch Switch with Indicator, PAUSE (Red)	AH
D727	RH-PX1006AFZZ	Touch Switch with Indicator, SPACE (Red)	AH
D728	RH-PX1006AFZZ	Touch Switch with Indicator, REC (Red)	AH

COILS

L101, L102	VP-LH100M0000	10μH, Choke	AB
L103	RCILZ0052AFZZ	18μH, Phase Shift	AB
L104, L105	RCILI0011SGZZ	19kHz, Low Pass Filter	AG
L106	RCILA0425AFZZ	SW Antenna	AD
L107	RCILZ0060AFZZ	92mH, Choke	AE
L108, L109, L110	RCILA0423AFZZ	AM Antenna Ass'y	AN
L111	RCILB0391AFZZ	SW Oscillator	AE
L112	RCILB0427AFZZ	MW Oscillator	AD
L113	RCILB0388AFZZ	LW Oscillator	AD
L114, L115	VP-LH101M0000	100μH, Choke	AB
L117	VP-LH470M0000	47μH, Choke	AB
L118	VP-LH100M0000	10μH, Choke	AB
L201	VP-LH101M0000	100μH, Choke	AB
L301	VP-LH101M0000	100μH, Choke	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
L302, L303	VP-LH101M0000	100μH, Choke	AB
L304	VP-LH100M0000	10μH, Choke	AB
L501, L502	RCILL0057AFZZ	MPX Filter (Dolby NR)	AF
L503, L504	RCILL0054AFZZ	MPX Filter (Dolby NR)	AG
L505, L506, L507, L508, L509, L510	RCILZ0019AGZZ	6.8mH, Record Equalizer	AD
L511	RCILB0419AFZZ	Bias Oscillator	AE
L512, L513	RCILB0420AFZZ	Bias Step up	AE
L517, L518	VP-LH101M0000	100μH, Choke	AB
L520, L521, L522	VR-LH101M0000	100μH, Choke	AB

TRANSFORMERS

●T1	RTRNP0543AFZZ	Main Power	BQ
●T2	RTRNP0544AFZZ	Sub Power	AV
T101	RCILD0055AFZZ	FM Quadrature	AE
T102	RCILD0056AFZZ	FM Quadrature	AE
●T103	RCILI0209AFZZ	AM IF (455kHz)	AH
T104	RCILI0222AFZZ	AM IF Trap Filter	AD
●T105	RCILI0219AFZZ	AM IF (455kHz)	AE

CERAMIC FILTERS

CF101, CF102	RFILF0009AFZZ	FM IF	AE

THERMISTER

PH301	RH-QX1002AFZZ	Power IC Protector (Positive)	AG

CONTROLS

VC101, VC102, VR107	RVC-A0050AFZZ	Variable Tuning Gang	AX
TC101	RTO-H1007AFZZ	Trimmer, SW Antenna	AC
TC102	RTO-H1007AFZZ	Trimmer, MW Antenna	AC
TC103	RTO-H1007AFZZ	Trimmer, LW Antenna	AC
TC104	RTO-H1053AFZZ	Trimmer, SW Oscillator	AC
TC105	RTO-H1053AFZZ	Trimmer, MW Oscillator	AC
TC106	RTO-H1053AFZZ	Trimmer, LW Oscillator	AC
VR101	RVR-M0144AFZZ	6.8K ohm (B), V.C.O. Adjust	AD
VR102	RVR-M0141AFZZ	1K ohm (B), Separation Adjust	AD
VR103	RVR-M0179AFZZ	22K ohm (B), Low Frequency Adjust	AE
VR104	RVR-M0128AFZZ	20K ohm (B), FM Pre-set Meter Adjust	AC
VR105	RVR-M0126AFZZ	5K ohm (B), FM Pre-set Meter Adjust	AC
VR106	RVR-M0065AGZZ	4.7K ohm (B), High Frequency Adjust	AF
VR108	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U1)	AG
VR109	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U2)	AG
VR110	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U3)	AG
VR111	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U4)	AG
VR112	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U5)	AG
VR113	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U6)	AG
VR114	RVR-Z0065AFZZ	100K ohm (B), FM Pre-set Tuning (U7)	AG
VR201 (A, B)	RVR-Z0066AFZZ	100K ohm (B), Volume Control	AP
VR202	RVR-Q0064AFZZ	100K ohm (B), Balance	AG
VR203 (A, B)	RVR-P0064AFZZ	100K ohm (A), Treble	AK
VR204 (A, B)	RVR-P0064AFZZ	100K ohm (A), Bass	AK
VR501, VR502	RVR-M0127AFZZ	10K ohm (B), Playback Sensitivity Adjust	AC
VR503, VR504	RVR-Q0063AFZZ	50K ohm (A), Record Level Control	AF
VR505, VR506	RVR-M0127AFZZ	10K ohm (B), Level Meter Sensitivity Adjust	AC
VR507, VR508, VR509, VR510	RVR-M0127AFZZ	10K ohm (B), Overall Sensitivity Adjust	AC
VR511, VR512	RVR-M0126AFZZ	5K ohm (B), Overall Sensitivity Adjust	AC
VR513, VR514	RVR-M0127AFZZ	10K ohm (B), Bias Adjust	AC
VR801	RVR-M0178AFZZ	2.2K ohm (B), FM Pre-set Muting Adjust	AE
	RTUNV0050AFZZ	FM Tuner (Front-end) Ass'y	BB
VR1001	91ZSR19R100	100K ohm (B), Arm Return Sensor Adjust (RV1)	AE
VR1002	91ZSR19R1K	1K ohm (B), Sensor Sensitivity Adjust (RV2)	AE
VR1101	91ZSR19R330	330 ohm (B), Frequency Multiple Adjust (VR31)	AE
VR1102	91ZSR19R5K	5K ohm (B), Turntable Speed (33-1/3 r.p.m.) Adjust (VR32)	AE
VR1103	91ZSR19S5K	5K ohm (B), Turntable Speed (45 r.p.m.) Adjust (VR33)	AE
VR1104	91ZCR19R330	330 ohm (B), Hall Device Adjust (VR34)	AE
VR1105	91ZV8K4-1-500	500 ohm (B), 4 Coil Current Adjust (VR35)	AE
VR1106	91ZV8K4-1-500	500 ohm (B), 4 Coil Current Adjust (VR36)	AE
VR1107	91Z5K	5K ohm (B), Stroboscope Frequency Adjust (VR37)	AE

ELECTROLYTIC CAPACITORS

C1, C2	RC-PZ061CAFZZ	.05MFD, 250V, Oil	AG
C108	VCAAAU1EB474K	.47MFD, 25V, ±10%, Aluminum	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C111	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C118	VCEAAU1EW475A	4.7MFD, 25V, +75 –10%	AB
C119	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C123	VCEAAU1EW336Y	33MFD, 25V, +50 –10%	AC
C125	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD
C127	VCAAAU1EB224K	.22MFD, 25V, ±10%	AC
C128	VCAAAU1EB474K	.47MFD, 25V, ±10%	AC
C129, C130	VCEAAU1EW335A	3.3MFD, 25V, +75 –10%	AB
C162	VCEAAU1EW475A	4.7MFD, 25V, +75 –10%	AB
C169	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD
C171, C172	VCEAAU1EW335A	3.3MFD, 25V, +75 –10%	AB
C177	VCAAAU1EB104K	.1MFD, 25V, ±10%, Aluminum	AC
C179	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C181, C182	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C183	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC
C201, C202	VCEALU1EC335A	3.3MFD, 25V, +75 –10%	AC
C203, C204	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C213, C214	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C215, C216	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C217	VCEAAU1HW107Y	100MFD, 50V, +50 –10%	AD
C218, C219, C220, C221, C222	VCEAAU1HW336Y	33MFD, 50V, +50 –10%	AC
C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234	VCEALU1HC105A	1MFD, 50V, +75 –10%	AC
C237, C238	VCEALU1EC335A	3.3MFD, 25V, +75 –10%	AC
C239, C240	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C245, C246	VCEALU1HW224M	.22MFD, 50V, ±20%	AB
C247, C248	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C257, C258	VCEALU1HW224M	.22MFD, 50V, ±20%	AB
C259, C260	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C263, C264	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C265, C266	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C271, C272	VCEALU1HW104M	.1MFD, 50V, ±20%	AB
C277	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C278	VCEAAU1HW107Y	100MFD, 50V, +50 –10%	AD
C291	VCEAAU1HW106Y	10MFD, 50V, +50 –10%	AC
C292	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB

REF. NO.	PART NO.	DESCRIPTION	CODE
C303, C304	VCEALU1EC335A	3.3MFD, 25V, +75 –10%	AC
C305, C306	RC-EZ1012AFZZ	47MFD, 50V	AC
C307, C308	RC-EZ1038AFZZ	47MFD, 16V	AB
C315	VCEAAU1HW107Y	100MFD, 50V, +50 –10%	AD
C317	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C318	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C319	VCEAAU1JW337Y	330MFD, 63V, +50 –10%	AF
C320	VCEASU1HW337Y	330MFD, 50V, +50 –10%	**
C321	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C322	VCEAAU1EW107Y	100MFD, 25V, +50 –10%	AC
C323	VCEAAU1EW227Y	220MFD, 25V, +50 –10%	AC
C324	VCEAAU1VW108Y	1000MFD, 35V, +50 –10%	AG
C327	VCEAAU1HW107Y	100MFD, 50V, +50 –10%	AD
C329, C330	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C335	VCEAAU1VW228Y	2200MFD, 35V, +50 –10%	AK
C337	VCEAAU1CW477Y	470MFD, 16V, +50 –10%	AD
C338	RC-EZ1062AFZZ	2200MFD, 16V	AF
C339	RC-EZS228AF1G	2200MFD 40V	AH
C340	RC-EZ1074AFZZ	33MFD, 100V	AD
C341	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD
C344, C345	RC-EZS568AF1G	5600MFD, 42V	AP
C346	VCEAAU2CW336Y	33MFD, 160V, +50 –10%	AE
C347	RC-EZ1013AFZZ	10MFD, 50V	AB
C348	VCEAAU1CW108Y	1000MFD, 16V, +50 –10%	AE
C349, C350	RC-EZ1012AFZZ	47MFD, 50V	AC
C351, C352	VCEAAU1HW106Y	10MFD, 50V, +50 –10%	AC
C357	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C358	VCEAAU1JW336Y	33MFD, 63V, +50 –10%	AC
C359	VCEAAU1HW477Y	470MFD, 50V, +50 –10%	AG
C380	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C385	VCEAAU1VW477Y	470MFD, 35V, +50 –10%	AE
C402, C403, C404, C405, C406, C407	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C409, C410	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C411, C413, C414	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C415	VCEALU1CW106M	10MFD, 16V, ±20%	AB
C418, C419	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C420	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC
C426	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C428	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C429	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C430, C431	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C432, C433	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C434	VCEAAU1EW475A	4.7MFD, 25V, +75 –10%	AB
C436	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C501, C502	VCEALU1HC225A	2.2MFD, 50V, +75 –10%	AC
C509	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C510	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC
C511, C512	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C515	VCEAAU1CW227Y	220MFD, 16V, +50 –10%	AC
C516	VCEAAU1EW227Y	220MFD, 25V, +50 –10%	AC
C517	VCEAAU1CW227Y	220MFD, 16V, +50 –10%	AC
C518	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C519, C520, C521, C522	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C523, C524	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC
C525	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C526	VCEAAU1CW477Y	470MFD, 16V, +50 –10%	AD
C527, C528	VCEAAU1AW227Y	220MFD, 10V, +50 –10%	AC
C529, C530, C535, C536, C537, C538	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C543, C544	VCAAAU1EB104K	.1MFD, 25V, ±10%, Aluminum	AC
C545, C546	VCAAAU1EB334K	.33MFD, 25V, ±10%	AC
C547, C548, C549, C550	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C551, C552	VCEAAU1EW335A	3.3MFD, 25V, +75 –10%	AB
C553, C554	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C555	VCEAAU1EW475A	4.7MFD, 25V, +75 –10%	AB
C556, C557, C558, C559, C560, C561	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C574	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD
C581	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C582	VCEAAU1VW107Y	100MFD, 35V, +50 –10%	AD
C583	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C586	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C588	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C589	VCEALU1HW474M	.47MFD, 50V, ±20%	AB
C590	VCEALU1HW335M	3.3MFD, 50V, ±20%	AC
C591	VCEALU1HW474M	.47MFD, 50V, ±20%	AB
C592	VCEALU1HW105M	1MFD, 50V, ±20%	AD
C593	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C594	VCEAAU1AW107Y	100MFD, 10V, +50 –10%	AB
C595	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C596	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C597, C598	VCEAAU1CW476Y	47MFD, 16V, +50 –10%	AC
C600	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C601	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C603	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC
C604	VCEAAU1HW335A	3.3MFD, 50V, +75 –10%	AB
C605	VCEAAU1HW106Y	10MFD, 50V, +50 –10%	AC
C606	VCEAAU1HW476Y	47MFD, 50V, +50 –10%	AC

REF. NO.	PART NO.	DESCRIPTION	CODE
C607	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C608	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C610, C611	VCEAAU1CW476Y	47MFD, 16V, +50 –10%	AC
C614	VCEAAU1CW107Y	100MFD, 16V, +50 –10%	AC
C619, C620	VCEALU1HW104M	.1MFD, 50V, ±20%	AB
C621, C622	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C680, C681, C683, C684, C685, C686, C687	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C770, C771	VCEALU1EW475M	4.7MFD, 25V, ±20%	AD
C758	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C759, C760	VCEAAU1EW106Y	10MFD, 25V, +50 –10%	AB
C802	VCEAAU1AW476Y	47MFD, 10V, +50 –10%	AB
C803, C804, C805, C806	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C807	VCEAAU1HW105A	1MFD, 50V, +75 –10%	AB
C812	VCEAAU1EW476Y	47MFD, 25V, +50 –10%	AC
C813	VCEAAU1AW476Y	47MFD, 10V, +50 –10%	AB
C815	VCEALU1HW224M	.22MFD, 50V, ±20%	AB
C820, C826	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C828	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC
C829	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C830	VCSATU1EF105M	1MFD, 25V, ±20%, Tantalum	AC
C831	VCEAAU1CW106Y	10MFD, 16V, +50 –10%	AB
C835, C836	VCEALU1EW106M	10MFD, 25V, ±20%	AB
C841	VCEAAU1AW336Y	33MFD, 10V, +50 –10%	AB
C901, C903	91Z4.7MF25V	4.7MFD, 25V	AG
C905, C909, C910	91Z47MF10V	47MFD, 10V	AC
C913	91Z10MF16V	10MFD, 16V	AC
C914, C915	91Z100MF10V	100MFD, 10V	AG
C917	91Z4.7MF25V	4.7MFD, 25V	AG
C918	91Z0.47MF50V	3.3MFD, 50V	AC
C930	91Z100MF10V	100MFD, 10V	AG
C1001	91Z33MF25V	33MFD, 25V, ±20% (C1)	AG
C1002	91Z1MF50V	1MFD, 50V (C2)	AG
C1003	91Z10MF16V	10MFD, 16V (C3)	AC
C1004	91Z0.47FM50V	.47MFD, 50V (C4)	AC
C1105	91Z1MF50V	1MFD, 50V (C35)	AG
C1106	91Z1MF50V	1MFD, 50V (C36)	AG
C1107	91Z0.47MF50V	.47MFD, 50V (C37)	AC
C1108	91Z100MF25V	100MFD, 25V (C38)	AG
C1109	91Z1MF50V	1MFD, 50V (C39)	AG
C1110	91Z1MF50V	1MFD, 50V (C40)	AG
C1111	91Z1MF50V	1MFD, 50V (C41)	AG
C1112	91Z1MF50V	1MFD, 50V (C42)	AG
C1115	91Z0.22MF50V	.22MFD, 50V (C45)	AC
C1116	91Z0.22MF50V	.22MFD, 50V (C46)	AC

PARTS LIST

CAPACITORS

REF. NO.	PART NO.	DESCRIPTION	CODE
C120	VCQYKU1HM473K	.047MFD, 50V, ±10%, Mylar	AC
C121, C122	VCQYKU1HM682J	.0068MFD, 50V, ±5%, Mylar	AC
C126	VCQSMU1HS152J	1500PF, 50V, ±5%, Styrol	AB
C132, C134	VCQYKU1HM102K	.001MFD, 50V, ±10%, Mylar	AB
C145	VCQSMT1HS472J	4700PF, 50V, ±5%, Styrol	AC
C151	VCQSMT1HS471J	470PF, 50V, ±5%, Styrol	AB
C153	VCQSMU1HS181J	180PF, 50V, ±5%, Styrol	AB
C176	VCQYKU1HM183K	.018MFD, 50V, ±10%, Mylar	AB
C197	VCQYKU1HM153K	.015MFD, 50V, ±10%, Mylar	AB
C209, C210	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AC
C211, C212	VCQYKU1HM563J	.056MFD, 50V, ±5%, Mylar	AC
C253, C254	VCQYKU1HM563K	.056MFD, 50V, ±10%, Mylar	AC
C267, C268	VCQYKU1HM122K	.0012MFD, 50V, ±10%, Mylar	AB
C269, C270	VCQYKU1HM103K	.01MFD, 50V, ±10%, Mylar	AB
C273, C274	VCQYKU1HM153K	.015MFD, 50V, ±10%, Mylar	AB
C275, C276	VCQYKU1HM823K	.082MFD, 50V, ±10%, Mylar	AC
C289, C290	VCQYKU1HM272K	.0027MFD, 50V, ±10%, Mylar	AB
C313, C314, C331, C332, C382	VCQYSH1HM104J	.1MFD, 50V, ±5%, Mylar	AC
C416, C417, C425	VCQYKU1HM103K	.01MFD, 50V, ±10%, Mylar	AB
C513, C514	VCQYKU1HM682J	.0068MFD, 50V, ±5%, Mylar	AC
C531, C532	VCQYKU1HM273J	.027MFD, 50V, ±5%, Mylar	AC
C533, C534	VCQYKU1HM472J	.0047MFD, 50V, ±5%, Mylar	AC
C539, C540	VCQYKU1HM473J	.047MFD, 50V, ±5%, Mylar	AC
C541, C542	VCQYKU1HM562J	.0056MFD, 50V, ±5%, Mylar	AC
C562, C563	VCQYKU1HM183J	.018MFD, 50V, ±5%, Mylar	AC
C564, C565	VCQYKU1HM393J	.039MFD, 50V, ±5%, Mylar	AC
C566, C567	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AC
C568, C569	VCQYKU1HM223J	.022MFD, 50V, ±5%, Mylar	AC
C570, C571	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AC
C572, C573	VCQYKU1HM682K	.0068MFD, 50V, ±10%, Mylar	AB
C576	VCQYKU1HM333J	.033MFD, 50V, ±5%, Mylar	AC
C577	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AC
C580	VCQYKU1HM562J	.0056MFD, 50V, ±5%, Mylar	AC
C584	VCQYKU1HM223J	.022MFD, 50V, ±5%, Mylar	AC
C585	VCQYKU1HM102K	.001MFD, 50V, ±10%, Mylar	AB
C801, C811, C851	VCQYKU1HM683K	.068MFD, 50V, ±10%, Mylar	AC
C852	VCQYKU1HM223K	.022MFD, 50V, ±10%, Mylar	AB
C853	VCQYKU1HM683K	.068MFD, 50V, ±10%, Mylar	AC
C912, C916	VCQYKU1HM104K	.1MFD, 50V, ±10%, Mylar	AC
C1101	VCQYKU1HM104K	.1MFD, 50V, ±10%, Mylar (C31)	AC
C1102	VCQYKU1HM103K	.01MFD, 50V, ±10%, Mylar (C32)	AB
C1103	VCQYKU1HM103K	.01MFD, 50V, ±10%, Mylar (C33)	AB
C1104	VCQYKU1HM104K	.1MFD, 50V, ±10%, Mylar (C34)	AC
C1113	VCQYKU1HM104K	.1MFD, 50V, ±10%, Mylar (C43)	AC
C1114	VCQYKU1HM104K	.1MFD, 50V, ±10%, Mylar (C44)	AC

RESISTORS

REF. NO.	PART NO.	DESCRIPTION	CODE
RA701	RMPTC0005AFZZ	Resistor Array, 2.2K ohm x 4	AC
RA702	RMPTC0007AFZZ	Resistor Array, 10K ohm x 4	AC
RA802	RMPTC0006AFZZ	Resistor Array, 4.7K ohm x 4	AC
R165	VRG-ST2EA330J	33 ohm, 1/4W, ±5%, Fusible	AB
R307, R308, R311, R312	VRG-ST2EA101J	100 ohm, 1/4W, ±5%, Fusible	AB
R329	VRG-ST2EA390J	39 ohm, 1/4W, ±5%, Fusible	AB
R330	VRG-ST3AA1R0J	1 ohm, 1W, ±5%, Fusible	AC
R340	VRG-ST3AA220J	22 ohm, 1W, ±5%, Fusible	AC
R344	VRG-ST3AA1R0J	1 ohm, 1W, ±5%, Fusible	AC
R380	VRG-ST2EA4R7J	4.7 ohm, 1/4W, ±5%, Fusible	AB
R638	VRG-ST2EA561J	560 ohm, 1/4W, ±5%, Fusible	AB
R675	RR-XZ1020AFZZ	22 ohm, 3W, ±10%, Fusible	AD

TAPE DECK PARTS

REF. NO.	PART NO.	DESCRIPTION	CODE
001	LCHSS0127AFZZ	Sub-chassis	AK
002	RHEDH0062AFZZ	Head, Record/Playback	AY
003	RHEDA0061AFZZ	Head, Erase	AK
004	MLEVF0768AFZZ	Lever, Pinch Roller	AC
005	LSLVM0077AFFW	Sleeve, Head	AB
006	MSPRC0156AFFJ	Spring, Head	AB
007	MSPRC0031AGMN	Spring, Head Azimuth	AA
008	NBALS0004AGFJ	Ball	AA
009	MSPRT0490AFFJ	Spring, Pinch Roller	AA
010	RMOTM0076AFZZ	Motor, Reel	AX
011	NPLYN0001AFZZ	Pulley, Reel Motor	AE
012	LANGF0411AFZZ	Plate, Motor	AB
013	MLEVF0766AFZZ	Lever, APSS	AD
014	MSPRT0497AFFJ	Spring, APSS Lever	AA
015	RMOTP0050AFZZ	Motor, Capstan	BA
016	LANGT0652AFZZ	Bracket, Flywheel	AG
017	LBSHS0001AG00	Cushion Rubber, Motor	AA
018	LX-BZ0219AFFD	Screw, Motor Retaining	AA
019	QPWBF0712AFZZ	P.W. Board, Connecting	–
020	LX-WZ9056AFZZ	Washer, Capstan Motor Retaining	AA
021	LANGT0661AFZZ	Bracket, Counter	AE
022	KCOUB0068AFZZ	Counter, Tape	AT
025	MLEVP0102AFZZ	Lever, Cassette Tape Detector	AE
026	MSPRT0495AFFJ	Spring, Cassette Tape Detect Lever	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
027	LHLDX3058AFZZ	Cassette Holder (A)	AH
028	LANGF0416AFZZ	Bracket, Cassette Holder (A)	AD
029	MSPRT0498AFFJ	Spring, Cassette Holder Lock Lever	AB
031	MLEVF0784AFZZ	Lever, Eject	AC
032	MLEVF0770AFZZ	Lever, Cassette Holder Lock	AC
033	MSPRT0521AFFJ	Spring, Eject Lever	AA
034	MSPRT0510AFFJ	Spring, Cassette Holder (A)	AB
035	LANGF0417AFZZ	Bracket, Eject Lever	AH
036	LSLVM0075AFFW	Sleeve, Cassette Holder Lock Lever	AB
037	MSPRT0494AFFJ	Spring, Eject Prevention Lever	AA
038	QPWBF0730AFZZ	P.W. Board, Filter (P.W.B.only)	–
039	MLEVP0100AFZZ	Lever, Record Safety	AD
040	LANGF0415AFZZ	Bracket, Cassette Holder (B)	AF
041	PGIDM0062AFZZ	Guide, Cassette Tape (Left)	AE
042	PGIDM0063AFZZ	Guide, Cassette Tape (Right)	AE
043	LHLDX3059AFZZ	Cassette Holder (B)	AL
044	GCOVA1104AFSA	Cover, Cassette Tape Illumination	AF
048	NBRGC0060AFZZ	Bearing, Capstan	AF
049	LCHSM0287AFZZ	Main Chassis	–
050	MSPRP0169AFFJ	Spring (Plate type), Sub-chassis Retaining	AD
051	PCUSG0088AF00	Cushion, Sub-chassis	AB
052	PCUSG0061AF00	Cushion, Sub-chassis	AB
053	MSPRT0492AFFJ	Spring, Sub-chassis Return	AB
054	NIDR-0058AFZZ	Idler, Fast Forward/Rewind	AK
055	PGIDM0060AFZZ	Guide, Fast Forward/Rewind Idler	AB
056	MSPRT0493AFFJ	Spring, Fast Forward/Rewind Idler Guide	AA
057	MLEVF0765AFZZ	Lever, Fast Forward/Rewind Operation	AE
058	MLEVF0764AFZZ	Lever, Sub-chassis Operation	AC
059	MLEVF0767AFZZ	Lever, Take-up Idler Release	AC
060	NIDR-0021AGZZ	Idler, Take-up	AD
061	NDAIR0123AFSA	Turntable, Take-up	AG
062	NDAIR0124AFSA	Turntable, Supply	AE
063	MLEVP0064AFZZ	Lever, Take-up Idler	AD
064	MSPRT0491AFFJ	Spring, Take-up Idler Lever	AA
065	LX-WZ5018AGZZ	Washer, Turntable	AA
066	LX-WZ5012AGZZ	Washer, Take-up Idler	AA
067	LX-WZ5020AGZZ	Washer, Take-up Idler	AA
068	MLIFP0001AFZZ	Air Damper, Cassette Holder	AK
069	NFLYC0058AFZZ	Flywheel	AU
070	NPLYR0050AF00	Pulley, Take-up	AB
071	LX-WZ5037AGZZ	Washer, Flywheel	AA
072	NBLTH0061AFZZ	Belt, Drive	AD
073	NROLY0013AFZZ	Pressure Pinch Roller	AG
074	LANGT0682AFZZ	Bracket, Lamp	AB
075	LX-WZ9051AFZZ	Washer, Oil Cut	AA
076	NBLTK0122AFZZ	Belt, Tape Counter	AC
077	PZETF0129AFZZ	Insulator, Micro Switch	AB
078	LANGT0667AFZZ	Bracket, Tape Deck Retaining	AD
080	LX-BZ0214AFZZ	Screw, Flywheel Thrust Adjust	AB

PLAYER PARTS

REF. NO.	PART NO.	DESCRIPTION	CODE
101	91Z846573	Cabinet	BB
102	91Z846596	Chassis	AX
103	91Z896249	EP/LP Select Lever Ass'y (2)	AD
104	91Z896248	EP/LP Select Lever Ass'y (1)	AC
105	91Z896358	Spring, EP/LP Select Lever Ass'y (2)	AC
106	91Z851326	Main Gear } Matched Pair	AD
107	91Z896361	Spacer }	AD
108	91Z896243	Gear	AE
109	91ZDML-148L-3	Motor Ass'y	AX
110	91Z896240	Bracket, Motor Ass'y & Gear	AD
111	91Z896250	Operation Lever Ass'y	AG
112	91Z891452-2	Friction Rubber	AC
113	91Z896238	Lever, Motor Switch	AC
114	91Z896453	Solenoid, EP/LP Selector	AS
115	91Z896349-1	Spring, Solenoid	AC
116	91Z896245	Lever, EP/LP Selector	AD
117	91Z896537	Bracket, Solenoid	AD
118	91Z870560	Micro Switch, Motor	AH
119	91Z890755	Holder, Wire	AA
120	91Z896270	Stopper	AC
121	91Z896272	Leg	AH
122	91Z896272-1	Leg	AH
123	91Z895592	Cover, Lamp	AX
124	91Z895595	Holder, Lamp	AF
125	91Z896539	Spacer	AC
126	91Z896344-1	Switch, P.W.B. Ass'y	–
127	91Z896265	Knob, Speed Selector	AG
128	91Z895757-1	Neon Lamp Ass'y	AM
129	91Z894408	Holder, Wire	AA
130	91Z702986	Volume, Turntable Speed Fine Adjust	AG
131	91Z702233-3	Tube (3.7ϕ x 15ℓ)	–
132	91Z896318	Lamp, P.W. B. Ass'y	–
133	91Z896352	Photo Transistor, Record-size Detector	AL
134	91Z871418	Micro Switch, Power	AH
135	91Z893327	Insulator, Micro Switch	AB
136	91Z892618-1	Knob, Turntable Speed Fine Adjust	AL
137	91Z851379	Pick-up BASE Ass'y	AY
	91ZSTY-202	Stylus	AZ
138	91Z631492	Motor (DDM) with P.W.B. Ass'y	BY
139	91Z896543	Spacer, Motor Ass'y, Retianing	AB
140	91Z896355	Arm Control Lever Ass'y	AH
141	91Z895072	Eccentric Pin, Auto in Adjust	–
142	91Z801554	Spring, Arm Control Lever	AB
143	91Z896527	Terminal Strip (5-lugs) with Cord Ass'y	AN
144	91Z871354	Turntable Sheet	AW
145	91Z620026-2	Turntable	BM
146	91Z896274	Prism, Record-size Detector	AN
147	91Z890876	EP Adaptor	AG
148	91Z896421	Sensor, P.W.B. Ass'y	–
149	91Z896320	Sensor Ass'y	–
150	91Z891386	Player Control P.W.B. Ass'y	–
151	91Z896275	Prism, Record-size Detector	AN
152	91Z895591	Bracket, Lamp/Volume	–
	91Z851378	Pick Up Assembly	BP
	91Z895297	Cartridge	BB

MISCELLANEOUS

REF. NO.	PART NO.	DESCRIPTION	CODE
CNP101	QCNCM174EAFZZ	Plug, 5 Pin	AB
CNP102	QCNCM179KAFZZ	Plug, 10 Pin	AC
CNP201	QCNCM094CAFZZ	Plug, 3 Pin	AD
CNP202	QCNCM174EAFZZ	Plug, 5 Pin	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
CNP203	QCNCM190JAFZZ	Plug, 9 Pin	AD
CNP204	QCNCM095BAFZZ	Plug, 2 Pin	AC
CNP301, CNP302	QCNCM050BAFZZ	Plug, 2 Pin	AB
CNP401	QCNCM171BAFZZ	Plug, 2 Pin	AB
CNP402	QCNCM177HAFZZ	Plug, 8 Pin	AC
CNP403	QCNCM179KAFZZ	Plug, 10 Pin	AC
CNP501	QCNCM181MAFZZ	Plug, 12 Pin	AC
CNP502	Not Available	Tape Counter with 3 Pin Plug, Part of 022	–
CNP503	QCNCM0806SGZZ	Plug, 8 Pin	AE
CNP504	QCNCM174EAFZZ	Plug, 5 Pin	AB
CNP505	QCNCM172CAFZZ	Plug, 3 Pin	AB
CNP506	QCNCM177HAFZZ	Plug, 8 Pin	AC
CNP507	QCNCM1301AGZZ	Plug, 13 Pin	AE
CNP601	QCNCM180LAFZZ	Plug, 11 Pin	AC
CNP701	QCNCM189GAFZZ	Plug, 7 Pin	AD
CNP702	QCNCM178JAFZZ	Plug, 9 Pin	AC
CNP801	QCNCM192MAFZZ	Plug, 12 Pin	AD
CNP802	QCNCM191KAFZZ	Plug, 10 Pin	AD
CNP803	QCNCM194TAFZZ	Plug, 18 Pin	AE
CNP804	QCNCM192MAFZZ	Plug, 12 Pin	AD
CNP805	QCNCM195LAFZZ	Plug, 11 Pin	AD
CNP806	QCNCM172CAFZZ	Plug, 3 Pin	AB
CNP807	QCNCM176GAFZZ	Plug, 7 Pin	AC
CNP901	91Z5048-15A	Plug, 15 Pin	–
CNP902	91Z896351-8	Plug, Pin	AH
CNP903	91Z896351-4	Plug, 4 Pin	AE
CNP904	91Z896351-6	Plug, 6 Pin	AF
CNP905	91Z896351-7	Plug, 7 Pin	AG
CNP906	91Z896351-2	Plug, 2 Pin	AD
	QCNCM121NAFZZ	Connecting Plug, 13 Pin (Tape Deck P.W.B.)	AE
	QCNCM125SAFZZ	Connecting Plug, 17 Pin (Tape Deck P.W.B.)	AF
CNS101	QCNCW145EAFZZ	Socket, 5 Pin	AB
CNS102	QCNCW150KAFZZ	Socket, 10 Pin	AB
CNS201	91Z895473	Socket, 3 Pin (Part of 143)	–
CNS202	QCNCW145EAFZZ	Socket, 5 Pin	AB
CNS203	QCNCW0902AGZZ	Socket, 9 Pin	AC
CNS204	QCNCW085BAFZZ	Socket, 2 Pin	AB
CNS301	QCNCW059BAFZZ	Socket, 2 Pin	–
CNS302	QCNCW059BAFZZ	Socket, 2 Pin	–
CNS401	QCNCW142BAFZZ	Socket, 2 Pin	AA
CNS402	QCNCW148HAFZZ	Socket, 8 Pin	AB
CNS403	QCNCW150KAFZZ	Socket, 10 Pin	AB
CNS501	QCNCW152MAFZZ	Socket, 12 Pin	AB
CNS502	QCNCW086CAFZZ	Socket, 3 Pin	AB
CNS503	QCNCW0805SGZZ	Socket, 8 Pin	AC
CNS504	QCNCW145EAFZZ	Socket, 5 Pin	AB
CNS505	QCNCW143CAFZZ	Socket, 3 Pin	AA
CNS506	QCNCW148HAFZZ	Socket, 8 Pin	AB
CNS507	QCNCW163PAFZZ	Socket, 14 Pin	AF
CNS601	QCNCW151LAFZZ	Socket, 11 Pin	AB
CNS701	QCNCW0704SGZZ	Socket, 7 Pin	AC
•CNS702	QCNCW149JAFZZ	Socket, 9 Pin	AB
CNS801	QCNCW1201AGZZ	Socket, 12 Pin	AC
CNS802	QCNCW1002AGZZ	Socket, 10 Pin	AB
CNS803	QCNCW1801AGZZ	Socket, 18 Pin	AC
CNS804	QCNCW1201AGZZ	Socket, 12 Pin	AC
CNS805	QCNCW1101AGZZ	Socket, 11 Pin	AC
CNS806	QCNCW143CAFZZ	Socket, 3 Pin	AA
CNS807	QCNCW147GAFZZ	Socket, 7 Pin	AB
CNS901	91Z895382-4	Socket, 15 Pin	**
CNS902	91Z896535-4	Socket, 8 Pin	**

REF. NO.	PART NO.	DESCRIPTION	CODE
CNS903	91Z896535-2	Socket, 4 Pin	**
CNS904	QCNCW103FAFZZ	Socket, 6 Pin	AB
CNS905	QCNCW104GAFZZ	Socket, 7 Pin	AB
CNS906	91Z896535	Socket, 2 Pin	**
	QCNCW162VAFZZ	Socket, 22 Pin	AK
•F1	QFS-C402CAGNI	Fuse, 4 AT	AE
•F2	QFS-C800CAGNI	Fuse, 80 mAT	AG
F3, F4	QFS-C402CAGNI	Fuse, 4 AT	AE
F301	QFS-C631CAGNI	Fuse, 630 mAT	AE
F302	QFS-C321CAGNI	Fuse, 315 mAT	AE
F303	QFS-C202CAGNI	Fuse, 2.0 AT	AE
F304	QFS-C322CAGNI	Fuse, 3.15 AT	AE
F305, F306	QFS-C402CAGNI	Fuse, 4 AT	AE
J1	QJAKJ0053AFZZ	Jack, Headphone	AH
J201	QJAKJ0053AFZZ	Jack, Microphone (Left)	AH
J202	QJAKJ0053AFZZ	Jack, Microphone (Right)	AH
ME101	RMTRL0157AFZZ	Meter, Signal Strength	AS
ME102	RMTRE0070AFZZ	Meter, FM Pre-set	AS
ME501	RMTRL0158AFZZ	Meter, Record/Playback Level (Left)	AS
ME502	RMTRL0159AFZZ	Meter, Record/Playback Level (Right)	AS
M201	RMOTM0077AFZZ	Motor, Volume Control	AY
PL1, PL2, PL3, PL4	RLMPZ0050AFZZ	Lamp, Dial/Meter Illumination	AG
PL501	RLMPM0079AFZZ	Lamp, Cassette Tape Illumination	AF
PL701	RLMPM0080AFZZ	Lamp, APSS Indicator	AD
PL702	RLMPM0080AFZZ	Lamp, Reverse Indicator	AD
PL703	RLMPM0080AFZZ	Lamp, Fast Forward Indicator	AD
RLY101	RRLYZ0058AFZZ	Relay, LW/MW Selector	AL
RLY301	RRLYZ0057AFZZ	Relay, DC 24 V Protection Circuit	AV
RLY901	RRLYZ0058AFZZ	Relay, Speed Selector	AV
SOL501	RPLU-0072AFZZ	Solenoid, Record/Playback Switch	AS
SOL502	RPLU-0066AFZZ	Solenoid, Fast Forward/ Rewind	AV
SOL503	RPLU-0066AFZZ	Solenoid, Record/Playback	AV
•SO1	QSOCE0557AFZZ	Voltage Selector	AP
SO2	QSOCD2469AFZZ	Socket, Speaker (A)	AF
SO3	QSOCD2469AFZZ	Socket, Speaker (B)	AF
SO101	QSOCD2259AFZZ	Socket, FM ANT.	AD
SO102	QSOCD2260AFZZ	Socket, AM ANT.	AE
SO103	QSOCD2557AFZZ	Socket (DIN), REC/PB	AF
SW1	QSW-P0158AFZZ	Switch, Power	AM
SW2 (A–C)	QSW-P0165AFZZ	Switch Ass'y, Speakers Selector	AN
SW101 (A–D)	QSW-P0166AFZZ	Switch Ass'y, LOUDNESS/ MONO/AFC/FM MUTING	AN
SW201	QSW-P0169AFZZ	Switch with Button, Volume Increase	AH
SW202	QSW-P0169AFZZ	Switch with Button, Volume Decrease	AH
SW501	QSW-S0075AGZZ	Switch, Record/Playback	AH
SW502	QSW-P0168AFZZ	Switch, Beat Canceller	AG
SW503, SW504, SW505, SW506	QSW-P0167AFZZ	Switch Ass'y, BIAS/EQ/ALC/ DOLBY NR	AR
SW507	QSW-M0057AFZZ	Switch, Eject	AG

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
SW508	QSW-M0057AFZZ	Switch, Record Safety	AG
SW509	QSW-M0057AFZZ	Switch, Cassette Tape	AG
301	GCABA1472AFSA	Cabinet, Top	**
302	GCABB1472AFSA	Cabinet, Bottom	**
303	GCOVA1084AFSA	Dust Cover	BC
304	GCOVA1085AFSA	Cover, Hinge (Right)	AC
305	GCOVA1086AFSA	Cover, Hinge (Left)	AC
*306	GCOVD3006AFSA	Cover, FM ANT. Socket	AA
307	GCOVH3151AF00	Cover, Heatsink	**
308	GFTAC1080AFSA	Cassette Lid	**
309	GFTAF1004AFSA	Lid, Remote Control Compartment	**
310	GFTAU3074AFZZ	Cover, Cabinet Bottom	**
311	GMADD0059AFSA	Window Panel, Dial Scale/ Meter	**
312	HBDGB3001CESA	Badge, SHARP	AD
313	HDALP0386AFSA	Dial Scale	**
314	HDAP-0173AF00	Dial Plate	AL
315	HDECA0289AFSA	Decoration Panel, Cabinet Top (Right)	AU
316	HDECA0290AFSA	Decoration Panel, Cabinet Top (Left)	AU
317	HDECQ0064AFSA	Decoration Cover (Orange), FM STEREO	AB
318	HDECQ0064AFSB	Decoration Cover (Green), DOLBY NR	AB
319	HDECQ0075AFSA	Decoration Cover, VOLUME	**
•320	HINDM1219AFSA	Decoration Plate, Model	**
321	HINDP0126AFSA	Decoration Cover, APSS	**
322	HPNLC1240AFSA	Front Panel	**
323	HSSND0241AFSA	Dial Pointer	AE
324	JKNBK0168AFSA	Knob, Tuning Control	**
325	JKNBM0259AFSA	Button, LOUDNESS/MONO/ AFC/FM MUTING/TAPE Selector/ALC/DOLBY NR	**
327	JKNBM0261AFSA	Button, Beat Canceller Switch	**
328	JKNBP0055AFSC	Button, Mains Power Switch	**
329	JKNBP0078AFSB	Button Speakers Selector Switch	AC
330	JKNBP0084AFSA	Knob, BASS/TREBLE/ BALANCE Control	**
331	JKNBP0084AFSB	Knob, RECORD LEVEL Control	**
332	JKNBP0085AFSA	Button, EJECT	**
333	LANGF0195AFZZ	Plate, Main Power Transformer Retaining	**
334	LANGF0426AFZZ	Bracket, Cassette Lid	**
335	LANGF0431AFZZ	Bracket, Heatsink Retaining (Right)	**
336	LANGF0432AFZZ	Bracket, Heatsink Retaining (Left)	**
337	LANGF0443AF00	Plate, Cassette Lid Strengthening	**
338	LANGF0436AFZZ	Bracket, Volume Bracket Strengthening (Right)	**
339	LANGF0446AFZZ	Bracket, Volume Bracket Strengthening (Left)	–
340	LANGH0113AFZZ	Bracket, Cabinet Bottom Strengthening	**
341	LANGK0181AFZZ	Plate, Hinge Ass'y, Retaining	AB
342	LANGK0194AFZZ	Bracket, Logic P.W.B. Retaining	**
343	LANGQ0582AFZZ	Bracket, Record Level Control	**
344	LANGQ0583AFZZ	Bracket, Cabinet Bottom	**

REF. NO.	PART NO.	DESCRIPTION	CODE
345	LANGQ0584AFZZ	Bracket, Remote Control Socket	**
346	LANGR0433AFZZ	Bracket, Main Power Transformer	**
347	LANGR0434AFZZ	Bracket, Relay	**
348	LANGR0435AFZZ	Bracket, Volume Control	**
349	LANGT0683AFZZ	Bracket, Tuner/Tape Deck P.W.B. Retaining	**
350	LANGT0684AFZZ	Bracket, FM Pre-set Volume P.W.B. Retaining	**
351	LANGT0685AFZZ	Bracket, Touch Control P.W.B. Retaining	**
352	LANGT0687AFZZ	Bracket, Tuning Shaft	**
353	LANGT0688AFZZ	Bracket, Front Panel Retaining (Right)	**
354	LANGT0689AFZZ	Bracket, Front Panel Retaining (Left/Center)	**
355	LANGT0691AFZZ	Bracket, Dial Scale/Pulley (Right)	**
356	LANGT0692AFZZ	Bracket, Dial Scale/Pulley (Left)	**
357	LANGT0693AFZZ	Bracket, Meter	**
•358	LBSHC0004AGZZ	Bushing, Mains Supply Cord	AC
	LBSHC0053AFZZ	Bushing, Mains Supply Cord	AB
359	LHLDC1052AFZZ	Holder, AM Antenna	AD
360	LHLDP8057AF09	Holder with Lamp (FM STEREO/DOLBY NR)	**
361	LHLDW1027AGZZ	Holder, Wire	AA
362	LHLDW1053AFZZ	Holder, Wire	AB
363	LHLDW1066AFZZ	Holder, Wire	AA
364	LHLDW1067AFZZ	Band, Wire	AA
365	LHLDW1068AFZZ	Band, Wire	AA
366	LHLDW9002CEZZ	Holder, Wire	AA
367	LHLDW9003CEZZ	Holder, Wire	AA
368	LHLDZ1041AG00	Holder, LED (Power Source Indicator)	AB
369	LX-BZ0246AFZZ	Screw, Player Board Retaining	AA
370	LX-BZ0259AFFD	Screw, Remote Control Socket Retaining	AA
371	LX-HZ0001SGFD	Screw, Relay/Power P.W.B. Retaining	–
372	LX-HZ0066AFFD	Screw, Power Transformer Bracket Retaining	–
373	LX-NZ0120AFFD	Nut, Power Transformer Retaining	AA
374	MARMP0003AFZZ	Arm, Dust Cover (Right)	AD
375	MARMP0004AFZZ	Arm, Dust Cover (Left)	AD
376	MHNG-0110AFZZ	Hinge Ass'y (Right)	**
377	MHNG-0111AFZZ	Hinge Ass'y (Left)	**
378	MLEVF0794AFZZ	Lever, Cassette Lid Eject	**
379	MLEVP0025AG00	Lever, Cassette Lid Lock	AB
380	MLEVP0109AF00	Lever Ass'y, Cassette Lid Eject	**
381	MSPRT0304AFFJ	Spring, Dial Cord	AA
382	MSPRT0388AFFJ	Spring, Cassette Lid Eject	AA
383	MSPRT0526AFFJ	Spring, Cassette Lid Opening	**
384	MSPRZ0053AFFJ	Spring, Cassette Lid Opening	AA
385	NDRM-0002SGZZ	Drum, Dial Cord	AH
386	NPLYB0001SEZZ	Pulley (Small), Dial Cord	AC
387	NPLYB0001SGZZ	Pulley (Large), Dial Cord	AB
388	NPLYC0101AFFD	Shaft, Dial Cord Pulley	AA
389	NSFTD0182AFFW	Tuning Shaft with Flywheel	**
390	NSFTZ0064AFFW	Damper Shaft, Cassette Lid Opening	**
391	PCOVP3161AFZZ	Cover, Remote Control Unit Compartment	**

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
392	PCOVS3063AFZZ	Shield, Pre-amp. P.W.B.	**
393	PCOVU8112AF00	Cushion Rubber, Meter	AD
394	PCOVU8113AF09	Cover, Lamp (REV/APSS/ FWD)	**
395	PCUSF0008AF00	Felt, Push Switch Button	AA
396	PCUSF0009AF00	Felt, Volume Control Motor/ Cabinet Bottom	AA
397	PCUSF0010AF00	Felt, Cabinet Top	AA
398	PCUSF0011AF00	Felt, Cabinet Top (12 x 170 mm)	**
399	PCUSG0087AF00	Cushion, Cassette Lid (7ϕ)	**
400	PFLT-0277AFZZ	Felt, Leg	AB
401	PGIDH0053AFZZ	Guide, Cassette Lid Eject Lever	**
402	PGUMM0061AG00	Cushion Rubber, Dust Cover	AB
403	PGUMM0128AF00	Cushion Rubber, Dust Cover	**
404	PRDAR0164AF00	Heatsink, Power IC	AY
405	PRDAR0166AFFW	Heatsink, Transistor	AE
406	PSHEF0120AF00	Felt, Record Level Control	AA
407	PSHEF0121AF00	Felt, Bass/Treble/Balance Control	AA
408	PSHEF0122AF00	Felt, Volume Indicator Cover	AA
409	PSHEF0124AF00	Felt, Speakers Selector Switch	**
410	PSHEZ0067AFZZ	Sheet, Cabinet Top (Right)	**
411	PSHEZ0068AFZZ	Sheet, Cabinet Top (Left)	**
412	PSLDM7108AFZZ	Shield, Power P.W.B.	**
413	PSLDM7109AFZZ	Shield, Pre-amp. P.W.B.	**
414	PSLDM7110AFZZ	Shield, Tone P.W.B.	**
415	PSLDM7111AFZZ	Shield, Volume P.W.B.	**
416	PSPAG0062AF00	Spacer, Volume Control Motor	AB
417	PSPAH0050AF00	Felt, Cassette Lid (3.8ϕ)	**
418	PSPAS0065AF00	Spacer, Volume Indicator	**
419	PSPAV0057AFZZ	Spacer, FM Pre-set Volume	**
420	PSPAZ0076AFZZ	Felt, Eject Button	**
•421	QACCL0001AFZZ	Mains Supply Cord (SAA)	AR
	QACCS9001SE00	Mains Supply Cord (SEV, without Plug)	AG
	QACCZ0002TA0F	Mains Supply Cord (USA type Plug)	AF
	QACCZ0052AF00	Mains Supply Cord (CEE)	AP
	QACCZ0053AF00	Mains Supply Cord (EXMAA)	AK

REF. NO.	PART NO.	DESCRIPTION	CODE
422	QANTW0054AFZZ	FM Antenna	AL
423	QFSHC2051AFZZ	Holder, Fuse	AD
424	QFSHD1001AGZZ	Holder, Fuse	AB
425	QHWS-3206AGFN	Lug Terminal	–
426	QLUGL0201SEZZ	Terminal Strip, 3-lugs	AA
427	QLUGL0250AFZZ	Terminal Strip, 2-lugs	AC
428	QLUGL0451AFZZ	Terminal Strip, 4-lugs	AD
429	QLUGP0102AGZZ	Lug Terminal	AA
430	QLUGP0104AGZZ	Lug Terminal	AA
431	QLUGP0111CEFW	Lug Terminal (13mm)	AA
432	QLUGP9050AFFW	Lug Terminal (16mm)	–
433	QLUGP9052AFZZ	Lug Terminal	AA
*434	QPLGA0205AGZZ	Plug, Mains Supply Cord (QACCS9001CE00)	AK
435	QPWBF0713AFZZ	P.W. Board, Tuner	–
436	QPWBF0714AFZZ	P.W. Board, Power	–
437	QPWBF0715AFZZ	P.W. Board, Touch Control	–
438	QPWBF0716AFZZ	P.W. Board, Tape Deck	–
439	QPWBF0717AFZZ	P.W. Board, Logic PBW	–
440	QPWBF0718AFZZ	P.W. Board, Volume only	–
441	QPWBF0719AFZZ	P.W. Board, Pre-amp.	–
442	QPWBF0720AFZZ	P.W. Board, Tone	–
443	QPWBF0721AFZZ	P.W. Board, Sub Power	–
444	QPWBF0722AFZZ	P.W. Board, Lamp	–
	SPAKA0507AFZZ	Cushion, Player Board	**
	SPAKA0508AFZZ	Cushion, Back (Unit)	**
	SPAKA0509AFZZ	Cushion, Front (Unit)	**
	•SPAKC1118AFZZ	Packing Case	**
	SPAKP0110AFZZ	Sack, Unit	AH
	SPAKP0111AFZZ	Cushion (Small)	**
	SPAKP0113AFZZ	Cushion (Large)	**
	SPAKX0184AFZZ	Sheet, Cartridge/Weight Holding	**
	SSAKA0007SEZZ	Sack, Operation Manual etc.	AA
	SSAKA0080AGZZ	Sack, Cartridge/Weight	AA
	•SSAKA0101AFZZ	Sack, Mains Supply Cord	**
	SSAKH0010SEZZ	Sack, Player Board	**
	TINSL0121AFZZ	Operation Manual, English/ German/French	
	•TINSZ0094AFZZ	Operation Manual, Swedish	**
	•TTAGH0030AFZZ	Tag, English/German/French	**

DIFFERENCE BETWEEN SG-500H AND SG-500E

REF. NO.	SG-500H		SG-500E		DESCRIPTION
	PART NO.	CODE	PART NO.	CODE	
T1	RTRNP0543AFZZ	BQ	RTRNP0548AFZZ	––	Main Power
T2	RTRNP0544AFZZ	AV	RTRNP0549AFZZ	––	Sub Power
T103	RCILI0209AFZZ	AH	RCILI0221AFZZ	AH	AM IF (H:455 kHz, E:465 kHz)
T105	RCILI0219AFZZ	AE	RCILI0220AFZZ	AE	AM IF (H:455 kHz, E:465 kHz)
CNS702	QCNCW149JAFZZ	AB	QCNCW0902AGZZ	AC	Socket, 9 Pin
F1	QFS-C402CAGNI	AE	QFS-C252CAGNI	AE	Fuse (H:4 AT, E:2.5 AT)
F2	QFS-C800CAGNI	AG	QFS-C400CAGNI	AH	Fuse (H:80 mAT, E:40 mAT)
SO1	QSOCE0557AFZZ	AP	Not Used	––	Voltage Selector
SO104	Not Used	––	QSOCZ2161AFZZ	AG	Socket, FM EXT. ANT. (75 ohm)
306	GCOVD3006AFSA	AA	Not Used	––	Cover, FM EXT. ANT. Socket
320	HINDM1219AFSA	**	HINDM1227AFSA	**	Decoration Plate, Model
358	LBSHC0004AGZZ	AC	LBSHC0004AGZZ	AC	Bushing, Mains Supply Cord
	LBSHC0053AFZZ	AB			
421	QACCL0001AFZZ	AR	QACCB0052AF09	AM	Mains Supply Cord
	QACCS9001SE00	AG			
	QACCZ0002TA0F	AF			
	QACCZ0052AF00	AP			
	QACCZ0053AF00	AK			
422	QANTW0054AFZZ	AL	Not Used	––	FM Antenna
434	QPLGA0205AGZZ	AK	Not Used	––	Plug, Mains Supply Cord
445	Not Used	––	GCOVH3152AFSA	**	Cover, Voltage Selector
	SPAKC1118AFZZ	**	SPAKC1132AFZZ	**	Packing Case
	SSAKA0101AFZZ	**	Not Used	––	Sack, Mains Supply Cord
	TINSZ0094AFZZ	**	Not Used	––	Operation Manual, Swedish
	TTAGH0030AFZZ	**	Not Used	––	Tag, English/German/French